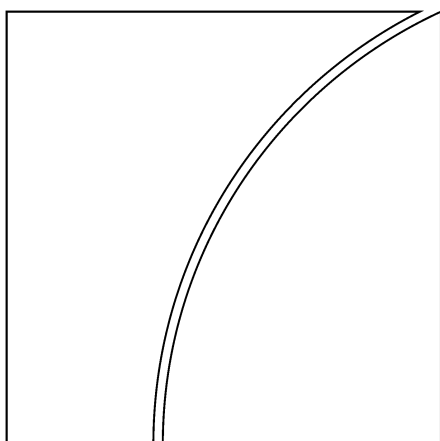


Committee on Payment and Settlement Systems



Payment and settlement systems in selected countries

Prepared by the Committee on Payment and Settlement Systems of the Group of Ten Countries

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Foreword

The Committee on Payment and Settlement Systems (CPSS) periodically publishes - under the aegis of the Bank for International Settlements (BIS) - reference works on payment arrangements in various countries, widely known as Red Books. This fifth edition of the Red Book is a further step towards increasing our understanding of the way payment systems (including securities settlement systems) work in the countries represented in the CPSS.

Properly functioning payment systems enhance the stability of the financial sector, reduce transaction costs in the economy, promote the efficient use of financial resources, improve financial market liquidity and facilitate the conduct of monetary policy. In recent years, issues relating to the economic efficiency and financial risks of all types of payment arrangements have come to the fore.

Compared with the previous edition published in 1993, the structure of this edition of the Red Book has been revised. The coverage of different segments and developments in payment systems, including securities settlement systems, has been broadened in individual country chapters. In addition, this edition contains a chapter on international payment arrangements and a more comprehensive glossary. I hope all this will make it easier for the reader to understand arrangements in the individual countries and to compare these arrangements across countries.

Statistical information is available separately in the annual statistical update *Statistics on payment and settlement systems in selected countries*, the latest of which was published by the BIS in April 2003.

I would like to thank the CPSS member central banks for their willingness to devote the necessary resources to the publication of this Red Book. A special word of thanks is due to the officials of individual central banks who were involved in the preparation of this edition and to Mr Gynedi Srinivas in the CPSS Secretariat for coordinating the work. Finally, I would like to express my gratitude to the BIS for the professional support given by its staff in the preparation of this volume.

Tommaso Padoa-Schioppa
Chairman, Committee on
Payment and Settlement Systems

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**Payment systems in
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List of abbreviations

BCC	Bank Card Company
BELARFI	Belgian Financial Architecture
BELFOX	Belgium Futures and Options Exchange
BFC	Banking and Finance Commission - <i>Commission bancaire et financière (CBF)/Commissie voor het Bank - en Financiewezen (CBF)</i>
BXS	Brussels Exchanges
CEC	Centre for Exchange and Clearing - <i>Centre d'Echange et de Compensation (CEC)/Uitwisselingscentrum en Verrekening (UCV)</i>
CIK	Inter-professional securities depository trust - <i>Caisse Interprofessionnelle de Dépôts et de Virements de Titres S.A./Interprofessionele Effectendeposito - en Girokas N.V.</i>
CVH - CPCB	Centralised processing of commercial bills - <i>Centrale voor de verwerking van handelspapier - Centrale pour le traitement des effets de commerce</i>
ELLIPS	Electronic Large-value Interbank Payment System
EMSS	Electronic matching and securities settlement
FMS system	Forward market settlement system
NBB	National Bank of Belgium - <i>Banque Nationale de Belgique (BNB)/Nationale Bank van België (NBB)</i>
POM	Public order member
PPS	Protected payment system

Introduction

Belgian payment systems are characterised by a very high level of automation. This particular situation is the result of efforts made by the credit institutions since the early 1970s to rationalise the processing of payment operations. Very early on, interbank cooperation led to several standardisation agreements, on which the entire process of automation is based. The first fundamental step was the establishment in 1974 of the Centre for Exchange and Clearing (CEC), after which retail payments began to be processed on an automated basis. The second important step towards the complete automation of the national payment systems was the launch in 1996 of the Electronic Large-value Interbank Payment System (ELLIPS), an RTGS system for large-value payments and a component of TARGET.

CEC will run into a third generation, namely CEC III. CEC III is designed to accept internet protocols in the exchange of payment messages. The central application will be rewritten to meet today's technology demands, eg public key infrastructure (PKI).

The National Bank of Belgium (NBB) has been very closely involved in these efforts. In addition to its more traditional role as settlement agent, it assumes the operational management of the interbank settlement systems, which, since 1 January 1999, no longer operate in Belgian francs but only in euros.

Credit transfers and related instruments are still predominant among the means of payment. The use of cheques has been declining steadily for several years. This instrument is tending to be replaced by card payments. Recent developments include the expansion of internet banking as well as new electronic money instruments, notably the nationwide expansion of a multipurpose prepaid card scheme.

1. The institutional aspects

1.1 General institutional framework

Financial intermediaries which provide payment services

Distinctions in the legal status and supervisory framework between commercial banks, savings banks and public credit institutions have disappeared completely since the new Law on the Status and Supervision of Credit Institutions came into force in 1993. Furthermore, most of the former public credit institutions are currently in the midst of a privatisation process and are selling the public shares to the private sector. By the end of December 2000 there were 119 credit institutions, of which 72 under Belgian law and 47 under foreign law (34 from member states of the European Union). The number of credit institutions has dropped significantly in the last few years as a result of a wave of mergers and acquisitions.

These credit institutions include the Post Bank, a subsidiary jointly owned by the Post and the largest Belgian private bank. The Post Bank, which has the status of a credit institution, markets - under the Post Bank logo - banking products such as current accounts, payment cards and savings products through its branch network.

The credit institutions and the Post are represented by 7,994 branches, ie one branch for every 1,283 inhabitants.

Non-bank institutions are also represented in the payment media market, in particular companies issuing in-house cards, luncheon vouchers and traveller's cheques (see Sections 2.2.4 and 2.2.7).

Legal aspects

To begin with, it should be pointed out that Belgium does not have a general legal and regulatory framework relating to payment systems, payment service providers or payment instruments. These areas are mainly governed by specific legislation or regulations, which are in part an implementation of EC Directives and are often aimed at consumer protection.

Second, the legal and regulatory framework applicable to payment systems, payment service providers and payment instruments has improved significantly in recent years with regard to various aspects of these topics.

The main texts governing payment systems and payment service providers are:

- (a) The Law on the Legal Status and Supervision of Credit Institutions (22 March 1993), which aims to protect the savings of the public and to safeguard the smooth functioning of the credit system by laying down rules for the establishment and the operation of the credit institutions as well as for the supervision of the latter. This Law also implements the provisions of the Second Banking Coordination Directive.

Furthermore, the Law on the Legal Status and Supervision of Credit Institutions contains a chapter on netting between credit institutions. The Law seeks to guarantee the legal certainty of offsetting agreements for debts between two or more credit institutions, where one of these institutions is involved in bankruptcy or in any other case involving concurrent claims governed by Belgian law.

Before this Law was adopted, the effectiveness of netting arrangements could be challenged under Belgian law with regard to two principles of bankruptcy law: a) the prohibition of any offsetting after bankruptcy, except between related debts; and b) the principle that the bankruptcy decision of the court has a retroactive effect, starting from the first hour of the day on which it was made ("zero hour rule").

These principles were likely to prevent the participation of the Belgian banks in international interbank netting systems, thereby depriving them of the advantages which might result from the consequent reduction in settlement costs and in credit and solvency risks involved in international financial operations. Moreover, the uncertainties which existed in Belgian law with regard to the possibility of relying upon netting agreements against third parties reduced the attraction of locating the centre of an international netting system in Brussels.

This is why express recognition is given, through Article 157 of the Law on the Legal Status and Supervision of Credit Institutions, to the legal validity of bilateral or multilateral offsetting agreements for claims between credit institutions themselves and between credit institutions and a clearing house, as well as to "closeout" agreements (express termination clauses in the event of bankruptcy or other default situations). These agreements are legally binding and enforceable against third parties (including a liquidator), subject to the conditions defined in this provision. In particular, it is clear that the claims to be offset no longer need to be related. The article also states that payments made by or to a credit institution on the date on which it has been declared bankrupt will be valid if they preceded the time of the bankruptcy decision or if they were made without knowledge of the fact that the credit institution was bankrupt.

The scope of Article 157 has been extended by a Royal Decree dated 28 January 1998 in such a way as to include, henceforth, most financial institutions (and is thus no longer limited to credit institutions).

- (b) The Law on Settlement Finality in Payments (Law on "Finality", 28 April 1999), which transposes Directive 98/26/EC. Moreover, Article 9 of this Law introduces a concept foreign to the Directive, stating that cash settlement accounts held with an operator or a settlement agent of a settlement system may not be blocked by any means by a participant (other than the operator or the settlement agent of the system), a counterparty or a third party.
- (c) Article 8 of the Organic Law of the NBB (22 February 1998), which entrusts the NBB with a supervisory power with regard to clearing, payment and securities settlement systems (see Section 1.2).

Few texts relating specifically to payment instruments exist under Belgian law. The most significant texts relating specifically to this topic are the following:

- the Law on Cheques (1 March 1961);
- the Royal Decree on the Indication of Homogeneous Financial Service Tariffs (23 March 1995);
- the Law on the Value Date of Bank Operations (10 July 1997);

- the Law on the Accountability for Interest Due on Accounts Opened by Credit Institutions or Other Legal Entities (14 July 1998); and
- the Law on Cross-Border Retail Payments (9 January 2000), which transposes the provisions of Directive 97/5/EC of the European Parliament and of the Council of 27 January 1997 concerning cross-border retail payments.

The Belgian legislator has also adopted:

- the Law on Electronic Payment Instruments, which will transpose an EU Recommendation dated 30 July 1997;
- Directive 1999/93/EC of the European Parliament and of the Council of 13 December 1999 on a European framework for electronic signatures, which has been translated into two Belgian laws:
 - (1) the Law on the Implementation of the Use of Telecommunications and Electronic Signature in the Legal and Extra Legal Procedure dated 20 October 2000; and
 - (2) the Law on Certain Rules in accordance with the Legal Framework for Electronic Signatures and Certificates dated 14 July 2001.

In addition to these texts, relations between credit institutions, consumers and retailers are mainly governed by contracts.

1.2 The role of the central bank

1.2.1 General responsibilities

The NBB is closely involved in the Belgian interbank clearing mechanisms: it runs and assumes the daily management of the CEC and of ELLIPS. The CEC is an ACH and is designed for retail payments; ELLIPS is an RTGS system and is part of the TARGET system. Furthermore, the NBB also operates the Securities Settlement System (SSS) for dematerialised government securities.

Since 1 January 1999 the NBB has been legally entrusted with the oversight of payment and clearing systems established in Belgium.

1.2.2 Oversight

The NBB's oversight responsibility has an explicit legal basis in Article 8 of its new Organic Law, which reads as follows: *"The Bank shall ensure that the clearing and payment systems operate properly and shall make certain that they are efficient and sound. It may carry out all transactions or provide facilities for these purposes. It shall provide for the enforcement of the regulations adopted by the ECB in order to ensure the efficiency and the soundness of the clearing and payment systems within the European Community and with other countries."* As is stipulated in the Explanatory Notes of this Organic Law, this responsibility covers both cash and securities settlement systems.

In line with the task assignment which was agreed at the Eurosystem level with regard to cash payment systems, the NBB performs the oversight of retail payment systems, Banksys (see Section 1.3), Europay, Euronext, Clearnet and some international enterprises (CLS Bank, EBA).

The NBB also oversees the SSSs established in Belgium: Euroclear Bank, BXS-Clearing and BXS-CIK.

Finally, the NBB also oversees SWIFT. A special arrangement was made in this respect by the Committee on Payment and Settlement Systems (CPSS), under which the NBB acts as leading overseer of SWIFT, and is supported by the central banks of the G10.

1.2.3 Supervision and audit

The NBB is not responsible for the supervision of individual credit institutions (microprudential supervision). This task is undertaken by a legally autonomous institution, the Banking and Finance Commission (BFC). The NBB is, however, concerned with the safety and stability of the financial system as a whole (macroprudential supervision).

Moreover, the NBB also contributes to the supervision exercised by the BFC. One Director of the NBB has a seat on the Board of the BFC as of right. The NBB collects the periodic and annual prudential reports from the credit institutions and sends them to the BFC. The BFC must consult the NBB before publishing regulations concerning solvency and liquidity. All the Belgian credit institutions are supervised by the BFC.

The NBB and the BFC each has its own specific role to play. Essentially, this means that oversight activities focus mainly on systems, while prudential activities focus mainly on institutions. The NBB and the BFC have a long tradition of cooperation.

The audit department of the NBB is concerned with the various clearing systems operated by the NBB (the CEC, ELLIPS and the Clearing House of Belgium) to the extent that the NBB is de facto responsible for the operational organisation of these systems.

1.2.4 Catalyst role of the National Bank of Belgium

The National Bank of Belgium participates in different forums regarding banking developments (e-payments, e-commerce, etc).

Since the beginning of the 1970s Belgian credit institutions have concluded various cooperative agreements in the field of information processing in order to facilitate interbank transactions. The NBB performs the administration of the Secretariat of Protocols. It is also actively involved in preparing and writing the agreements. The first so-called interbank protocol, signed on 8 July 1970, affected credit institution identification by establishing a uniform structure for account numbers, according to which the first three figures identify the institution.

1.3 The role of other private and public sector bodies

The main interbank organisations operating in the field of payment and securities systems are:

- the CEC, founded in 1974 by the banking sector as a whole in order to automate the exchange of payment transactions;
- ELLIPS, founded in 1995 as a non-profit association in order to manage the ELLIPS system;
- the BFC, which is the prudential authority (see Section 1.2.3);
- the Belgian Bankers' Association, a professional organisation which aims to promote its members' professional interests, mainly through economic studies, fiscal, legal and technical advice, and training;
- the Market Authority for the Brussels Stock Exchange (Euronext Belgium), the Market Authority for the Nasdaq Europe market and the Committee of the Securities Regulation Fund are the three market authorities in Belgium. They organise and regulate their markets and exercise first-level supervision. The BFC supervises the way in which the market authorities carry out their duties. This structure is currently under revision and could be subject to change in 2002; and
- Banksys, a company which operates, inter alia, the national ATMs, the POS network, and the electronic purse scheme, and the Bank Card Company (BCC), which is entrusted with the administration of two of the main credit card schemes (ie Visa and Eurocard/MasterCard).¹

¹ At the end of 1999 Banksys took over a large share of the activities of the BCC.

2. Payment media used by non-banks

2.1 Cash payments

Since 1 January 2002 all payments in Belgium have been processed in euros. The Belgian franc lost its legal value as payment instrument on 28 February 2002.

It is difficult to estimate the value or number of cash payments. The only indication available lies in the share of cash in M1, which has recorded a marked decline over a number of years. It amounted to 22.95% at the end of 2000,² compared with 43.7% at the end of 1980. The total stock of cash in circulation on 31 December 2000 amounted to EUR 14.1 billion. Studies indicate that the use of cash in payments declined by 37% over the first-half year after the changeover to the euro in favour of card payments.

2.2 Non-cash payments

Deposit money comprises sight deposits held by non-financial economic agents with financial intermediaries legally entitled to receive such deposits (credit institutions and the Post).

There is no statutory definition of current accounts. According to the regulation³ governing the financial data which the banks have to submit to the central bank and to the BFC on a monthly basis, current accounts are those on which deposited money can be immediately withdrawn.

Royal Decree no 56 of 10 November 1967 obliges businesses to hold an account to which credit transfers can be made by their customers. These are generally current accounts.

For credit transfers, the Law on Value Dates (10 July 1997) imposes a maximum of one working day between the debiting of the principal's account and the crediting of the payee's account. A similar regulation exists for savings accounts.

For other payment instruments, there are no formal regulations governing the practices regarding value dates, and maximum time limits for crediting counterparts are not statutory. Credit institutions must execute payment orders promptly, on the basis of the general law of contract. The standard practice regarding value dates in respect of "ordinary" customers is that accounts are debited one working day before the settlement date and credited one working day after. In the case of cheques which are in the process of being collected, the credit is temporarily revocable.

The principle of allowing providers of payment services to charge current account holders for such services was adopted in 1990.

Deposit money is rather heavily concentrated: the five largest credit institutions account for 73% of deposits by value.

2.2.1 Credit transfers

The most commonly used payment medium in Belgium is the credit transfer. The order is given by the customer making the payment to his/her bank either in paper form - handed in at his/her branch or sent by post - or in automated form (self-service banking, telephone and internet banking, magnetic media). An estimated 656.8 million credit transfers (including standing orders and inpayment transfers; see below and Section 2.2.5) were made in 2000, for a total value of EUR 16.13 billion.

The standing order is a form of credit transfer created in order to rationalise the system for recurring payments (payment of rent, etc). An estimated total of 81.85 million payments of this kind were made in 2000 for a total value of EUR 26.67 billion.

² A change in the definition of transferable deposits included in M1 means that data for 1999 are not comparable with the data from previous years.

³ Royal Decree of 24 November 1937.

A significant development can be seen in the growing popularity of electronic forms of payment orders made by customers in parallel with the growing popularity of self-service banking and home banking products. More and more firms are communicating their payment orders via magnetic media or telecommunications, which obviates the need to capture the data within the financial system. In 2000 it is estimated that 271.01 million payment orders - 41% of all credit transfers - were submitted in paperless form against 158 million - 31.5% - in 1990.

2.2.2 Cheques

The use of cheques, which until 1992 were the second most frequently used cashless payment instrument after the credit transfer, has diminished annually.

On 31 December 2000 there were 3.84 million cheque guarantee cards in circulation (3.67 million of which were eurocheque cards), equivalent to a theoretical average of 27 cards for every 100 current accounts. In 2000, 70.7 million cheques were issued for a total value of EUR 87 billion.

In addition to cheques issued by individual credit institutions and postal cheques, the eurocheque was commonly used in Belgium. For this type of cheque, the guarantee was completely phased out on 1 January 2002.

Cheques are exchanged in the CEC. Only non-truncated cheques of more than EUR 10,000 are still handled in the Clearing House of Belgium.

2.2.3 Direct debits

The direct debit mechanism was created in 1980. Its purpose, like that of the standing order, is to simplify the execution of regular payments. In 2000 it was estimated that 166.2 million payments were executed under direct debit agreements (against 113.5 million in 1996). Direct debits are mainly used for public utility bills.

Direct debit is based on a contract in accordance with which the payer authorises the payee to debit his/her account for specified claims. All signatories of the contract (payer, payee, debtor and bank of the payer) may repeal it. The revocation comes into effect no later than 10 days after the payer's bank has been informed.

2.2.4 Payment cards

Debit cards

Debit cards, issued by the credit institutions under their own logo in association with the logos of Bancontact and Mister Cash,⁴ can be used at ATM and POS terminals. The debit and cheque guarantee card functions are generally packed on the same support together with an e-money function. These cards are hybrid cards having both a magnetic strip, which is used for online operations requiring the use of a PIN before the services can be accessed (POS payments, cash withdrawals at ATMs, loading of e-purse, etc), and a chip, which is used for offline operations (e-money payments).

Banksys (see Section 1.3) is entrusted with the management of the ATM-POS network. Its duties include the monitoring of bank-issued cards and the PIN mailer production for all bank cards. Banksys participates directly in the ACH (see Section 3.3) and exchanges ATM and POS operations to be cleared in this system.

On 31 December 2000 there were 10.96 million debit cards in circulation, all of which provided access to both ATM and POS terminals, thus representing a ratio of 77 cards to every 100 current accounts.

The cost to the consumer of using debit cards at ATM and POS terminals in theory consists only of an annual fee, which is generally included in a package made up of current account management and operations. A small minority of retail outlets charge for POS transactions.

⁴ Bancontact and Mister Cash are the two former ATM-POS networks that merged in 1987 to form Banksys.

Over the last few years, the use of debit cards has gradually become internationalised. Within the framework of the Europay community, holders of Banksys cards also have access to ATMs in an increasing number of European countries, with reciprocity for foreign eurocheque cardholders. Similar interconnections have been established on a bilateral basis between Banksys and other foreign networks. Since 1998 holders of Banksys cards have also been able to pay abroad at Maestro POS.

Credit cards

Credit cards (American Express, Diners Club, Eurocard and Visa) are widely accepted in Belgium. As a result of vigorous promotional efforts by the companies concerned, the number of cards in circulation has shown a considerable increase in recent years: from some 326,000 at end-1985 to around 2,970,000 at end-2000. In 2000, 53.79 million transactions were effected in Belgium for a total of EUR 5.53 billion, 16.53 million of which were payments effected using foreign cards, for a total of EUR 1.80 billion.

BCC, of which the credit institutions are the shareholders, accounts for the distribution of the majority of Visa and Eurocard cards. Banksys is entrusted with the processing and authorisation of transactions executed using these cards on behalf of BCC.

Payment procedures are automated in most cases. At the point of sale, authorisation takes place online, details of the transaction are immediately recorded by the issuing company's computer system and a slip showing the transaction is printed out. The nationwide ATM network can also be accessed using credit cards (except for Diners Club cards).

Fixed liability tariffs for the loss of a credit card are laid down in the law.⁵

Retailer cards

Retailer cards issued by petrol companies and large retailers can, by their nature, only be used at points of sale controlled by their issuers. A distinction can be made between in-house cards meant for the issuer's own infrastructure and those which are in fact managed at the operational level by another commercial card issuer (interbank network or credit card issuer). The latter category comprises cards issued by petrol companies. Moreover, some of these retailer cards are linked with POS terminals, whereas others can only be used manually. One of the best-known cards, issued by a large retailer, can be used either as a debit card (in which case direct debit of the customer's bank account is initiated by the retailer) or as a credit card, the choice being made by the cardholder upon purchase. 1,507,000 cards were in circulation on 31 December 2000; 28.51 million transactions were recorded to the value of EUR 1.57 billion in 2000.

Electronic money

There is no software-based electronic money in Belgium. A multipurpose prepaid card scheme, called PROTON, was launched by Banksys in February 1995. Nationwide expansion was achieved at the beginning of 1998.

PROTON is a microprocessor card which stores monetary value as opposed to tokens or units of service (as a phonecard does). It is designed to be a substitute for cash and is targeted at payments below EUR 15 at local retail outlets, vending machines, car parks, ticket machines, payphones and on public transport. It can be loaded with amounts ranging from EUR 2.5 to EUR 125. Card-to-card payments are not possible.

PROTON is a domestic monocurrency system, the payments being made in euros. The loading transaction is processed with the verification of a PIN and of the funds available on the account. The cards can be reloaded at ATMs or at public telephone booths. A "smartphone", which enables the user to reload the card at home and to use the card to make payments to a service provider over the telephone, has also been available since the end of 1997. Furthermore, card-based payments can be made via the internet by means of a plug-in terminal (BANXAFE) for personal computers.

⁵ The Royal Decree of 24 February 1992, based on the Law on Consumer Credit of 12 June 1991, was published in the Belgian Law Gazette on 4 April 1992.

During a transaction, money is transferred from the PROTON card to the retailer's terminal (offline terminals or vending machines). As only small amounts are involved, and for the sake of speed and convenience, these payments are made without using a PIN. The retailer can transfer the money to his/her bank account simply by making a telephone call from his/her terminal (using the modem). The cardholder can consult the balance on his/her PROTON card at an ATM, public telephone booth, service provider's terminal or by means of a small personal pocket device.

PROTON is only issued by credit institutions. It is up to each institution to set the fees (if any) that it charges to cardholders. The annual fees charged to the cardholders range from EUR 0 to EUR 5. Using or downloading the cards must remain free of charge. Banksys is responsible for the tariff policy applied to the retailers. The retailers have to pay a percentage of the amount stored in their terminals plus a fixed fee (depending on the contract) per collect. At the end of December 2000 more than 8 million cards with the e-money facility had been issued; the total amount outstanding was around EUR 49.2 million. A daily average of 153,649 purchase transactions were made in December 2000 for an average amount of EUR 4.12.

In the near future Banksys will introduce a new payment instrument which allows wireless execution of card payments. This new instrument will work with a mobile phone connection. Through the mobile payment instrument, payments will be possible with both the prepaid card (PROTON) and debit cards.

The PROTON technology has already been adopted by a large number of countries, making it a de facto international standard. Proton World International can be seen as a spin-off of PROTON to commercialise the Proton technology worldwide. Since November 2001 Proton World International has been wholly owned by ERG, an Australian smartcard group.

Single purpose prepaid cards

Single purpose prepaid cards are mainly used in the telephone industry. In Belgium the first cards of this kind, launched in 1979 with the RTT-Telecard, were magnetic strip-type cards which enabled users to make national and international telephone calls from payphones. Although PROTON can now be used in payphones, such cards (now called Belgacom-Telecard) still exist and are now chip-based. All telephone operators also offer prepaid cards.

Other service providers, such as urban transport companies, make use of similar cards, albeit on a smaller scale.

POS network

Banksys manages the POS network and terminals online on behalf of the issuing credit institutions, which are the only shareholders of the company. These terminals are accessible by means of magnetic strip cards and secret PIN codes. In 1999 the Post ceased issuing its own debit cards and instead now makes use of Banksys' POS network.

Each transaction triggers various immediate checks:

- blacklist (stolen cards, etc);
- balance on current account, either on the basis of the balance at the previous day's close, taking into account the total of the operations effected on that day by means of the card, or on the basis of the actual balance (depending on the cardholder's institution); and
- amount of the daily and weekly transactions caps.

This online authorisation procedure eliminates fraud and unauthorised overdrafts.

By 31 December 2000, 116,436 POS terminals had been installed.

Whereas the POS terminals installed at petrol stations and large retail outlets are heavyweight terminals linked via rented lines to the network's computer centres, those installed at small retail outlets and in other sectors involve the use of the switched telephone network (STN).

The interbank network can be accessed not only using bank debit cards but also by means of credit cards and a range of in-house cards mainly issued by petrol companies which can be used exclusively at petrol stations selling their brands. These companies make use of the infrastructure of the interbank network, but offer additional advantages such as discounts and the possibility of using the card abroad. These services are specifically aimed at attracting corporate customers with fleets of vehicles.

ATM networks

Banksys manages the ATM network and terminals online on behalf of the issuing credit institutions. ATMs are accessible by means of magnetic strip cards and secret PIN codes.

Transactions supported by Banksys ATMs (open access ATMs) are cash withdrawals, the checking of balances on current accounts, the alteration of PIN codes and the loading of PROTON cards. Each transaction triggers various immediate checks (see the section entitled *POS network*).

In addition, several credit institutions offer ATM facilities (limited access ATMs) to their own customers within the framework of self-service banking units. These ATMs allow other types of transactions, such as the ordering of documents (credit transfer forms) and transfers between current accounts and savings accounts.

By 31 December 2000, 1,305 Banksys ATMs and 5,560 self-service banking units had been installed.

2.2.5 Postal instruments

The inpayment transfer is a hybrid payment instrument offered chiefly by the Post which enables a payment to be made to a holder of a (bank or postal) current account on the basis of a cash inpayment at a post office. This instrument is primarily intended for payers who do not have a current account. In 2000, 28.3 million inpayment transfers were made to a total value of EUR 6.06 billion, giving an average of EUR 211 per transaction. There is now a move to discourage the use of this instrument, which requires lengthy manual procedures, by applying a fee of EUR 0.42 per transaction.

2.2.6 Commercial bills

Since the end of 1997 the system for the centralised processing of commercial bills (CPCB-CVH), operated and managed by the NBB, has eliminated the physical circulation of commercial bills in the interbank circuit, replacing it with an automated data exchange through the CEC. To this end, the CVH system automatically centralises, retains and presents for cash processing all commercial bills domiciled at financial institutions represented in the CEC. In the case of non-payment of commercial bills, the CVH system carries out the complementary function, assigned to it by law, of central depository of bills of protest. It carries out the majority of administrative tasks relating to the preparation, recording and publication of bills of protest. This publication takes the form of a list, which is transmitted each month to the registries of the Trade Tribunals. The CVH system also ensures the distribution to third parties of information concerning published protests.

The use of the commercial bill⁶ and its variants has tended to decrease over recent years, although specific sectors of the economy still use it frequently. In 2000, 668,777 commercial bills were processed on behalf of 60 financial institutions. 30,793 bills of protest were established, half of which were published, the other half having been settled prior to publication.

2.2.7 Other payment instruments

Other instruments are also used in Belgium, the main ones being:

- the traveller's cheque; and
- the luncheon voucher.

Luncheon vouchers are issued by two French-owned companies (Le Chèque-Repas and Ticket Restaurant) to any firm wishing to distribute them to its employees as part of their remuneration package. Since 1 April 1994 their validity has been limited to three months and they may only be used for the payment of a restaurant bill or for the purchase of food products. Despite these strict limitations and the reduction in the tax advantages for the employer and the employee under the system, this instrument is still popular as an additional method of remuneration: 151.6 million luncheon vouchers

⁶ It could be argued that the commercial bill and its variants are not payment instruments as such, because settlement of the transaction underlying the bill has to be in the form of another payment medium (cash or deposit money). The commercial bill can, however, be passed to a third party by means of endorsement.

were issued in 2000 (against 95.03 million in 1990) for a total value of EUR 749 million (against EUR 394 million in 1990).

2.3 Recent developments

2.3.1 Internet

Home banking and, in particular, internet banking are very successful. Most banks have a website which allows their customers not only to carry out various common operations such as credit transfers, standing orders and balance checking, but also to manage their asset portfolios.

There is no specific payment instrument or system (for example, internet cheques or electronic bill presentment) currently available, but various projects are under way in this field and major developments are expected to take place in the next few years.

2.3.2 Standardisation of payment instruments

Great efforts are still being made to standardise payment instruments in order to facilitate their automated processing. In this respect, several working groups have been created by the Belgian Bankers' Association. The NBB collaborates actively with these groups.

2.3.3 Security of e-payments

Banksys already offers the option of paying with the prepaid, debit and credit card via the internet by means of a plug-in terminal for personal computers (see Section 2.2.4). Working in close cooperation with the credit card companies, Banksys has developed a system of hardware authentication for online transactions and offers an application that allows end-to-end secure electronic transactions from the customer (BANXAFE) through the Banksys infrastructure to the supplier. The system could also be extended to Wireless Application Protocol (WAP) and Interactive Television (iTV) applications.

3. Interbank exchange and settlement systems

3.1 General overview

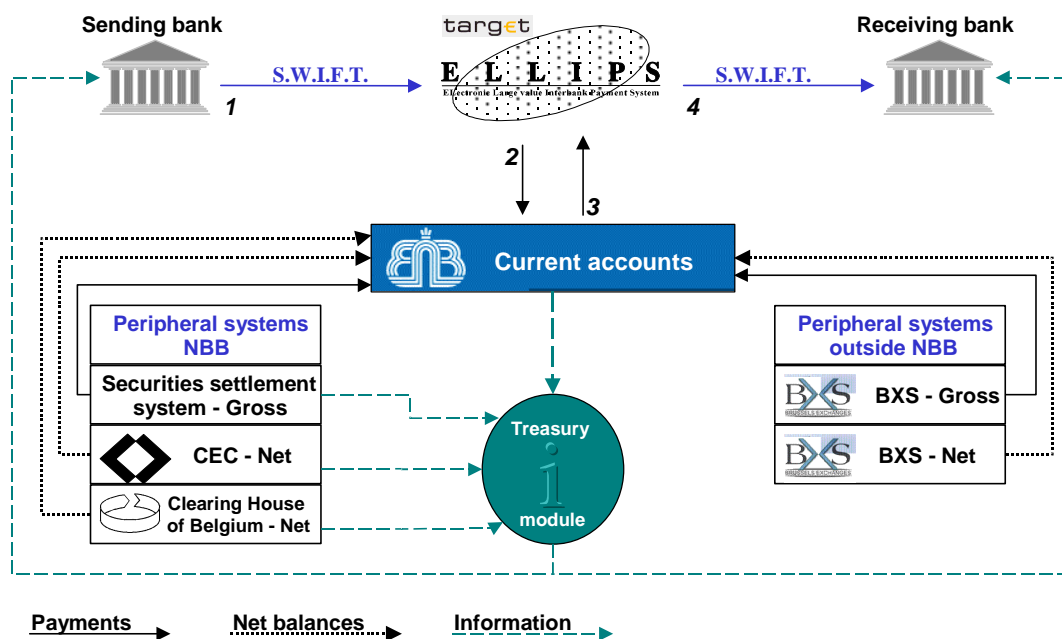
There are three domestic interbank payment systems in Belgium: ELLIPS, the CEC and the Clearing House of Belgium.

ELLIPS is an RTGS system designed to process large-value credit transfers. The CEC is the Belgian ACH for retail payments; it handles both credit and debit orders. Recently work has been carried out to introduce the third generation of the CEC, namely CEC III. These automated systems are the two pillars of the interbank payment system in Belgium. Together they process more than 99.5% of all interbank payments in both number and value.

The remaining interbank payments are processed by the Clearing House of Belgium, a paper-based system which only handles non-truncated cheques of more than EUR 10,000.

Since 1 January 1999 all these systems have operated solely in euros.

Chart 1
Interbank exchange and settlement



3.2 RTGS system: ELLIPS

3.2.1 Operating rules

ELLIPS is a non-profit-making association which has its registered office in the NBB in Brussels. Its operating rules were established by its General Assembly. The system has been operational since 24 September 1996.

The decision-making bodies are the Board of Directors and the General Assembly, both of which are composed of representatives of the members. The NBB acts as Chairman of the Board. It runs the system and assumes the daily management on a contractual basis between the NBB and ELLIPS. It is also a participant in the system.

3.2.2 Participation in the system

In ELLIPS, a two-tier system has been chosen. Direct participation in ELLIPS is confined to the credit institutions authorised in Belgium and the credit institutions operating on the Belgian market within the scope of the freedom of establishment and freedom to provide services within the European Economic Area. The latter implies the possibility of remote participation. The Post and the NBB are participants by right.

Direct participants must hold an account with the NBB and meet several conditions as described in the terms and conditions regarding operational capacity, solvency, legal guarantees and volume.

The direct participants can provide a representation service for other credit institutions (indirect participants). The payment orders of an indirect participant are processed in ELLIPS through its direct participant, who will also be responsible for the settlement of the operations.

ELLIPS is also the Belgian component of the European RTGS system in euros (TARGET). Thus participating in ELLIPS implies access to the TARGET system.

By the end of 2001, ELLIPS had 17 direct participants and 79 indirect participants.

3.2.3 Types of transactions handled

ELLIPS processes credit transfers in euros, for both interbank (MT202) and customer payments (MT100/103). ELLIPS processes both domestic and cross-border payments. Cross-border payments can be made to banks in any of the EU member states participating in TARGET, even those not participating in economic and monetary union.

The use of TARGET is compulsory for transactions directly related to the monetary policy of the ECB.

3.2.4 Operation of the transfer system

Transfers received by ELLIPS are checked immediately for (technical) validation. If a payment is rejected, a SWIFT message is sent to the initiator. Accepted orders are recorded in a file and treated individually and chronologically by the system according to the FIFO principle (first in, first out). But payments with a higher priority (priority codes 2 to 9) will always be handled first as soon as the payments are considered to be valid by the system.

If there is no waiting queue for the sender, ELLIPS treats the transaction as follows:

- the necessary information to settle the transaction is extracted from the payment instruction and sent to the NBB current accounts application (RECOUR);
- if sufficient funds are available on the settlement account held by the sending ELLIPS participant with the NBB, the payment is settled (sender debited, beneficiary credited) and becomes final immediately. ELLIPS is informed and instantly sends the relevant detailed messages to the beneficiary. If insufficient funds are available, the current accounts application informs ELLIPS of this event, and ELLIPS puts the payment instruction in the waiting queue until sufficient funds are available to execute it.

In order to ensure the smooth flow of payments, a bypass FIFO waiting queue mechanism exists. If a waiting queue already exists for the sender, the amount of the new accepted payment will be compared to that of payments in the waiting queue with the same priority. If the amount of the new payment turns out to be smaller than that of all other payments in the waiting queue, and if no payment with a higher priority appears in the waiting queue, the new payment will be processed as if no waiting queue existed. Otherwise the new payment will be placed in the waiting queue. Certain payments may be given preferential treatment, and a higher priority code is entered for such payment messages. An increase in the sender's available funds triggers the processing of the payment messages in the waiting queue. Payment messages with a higher priority code are always treated first. A new function of reservation of funds on settlement accounts has also been introduced to process time-critical payments.

After 5 pm ELLIPS no longer accepts customer payments (SWIFT MT100/MT103), with the exception of cross-border payments from TARGET. At 5.05 pm it tries to process the payments which are still in the waiting queue. In this case ELLIPS carries out a collective deblocking procedure.

At 6 pm ELLIPS no longer accepts interbank payments (MT202), with the exception of cross-border payments from TARGET. Again, at 6.05 pm a collective deblocking procedure is initiated for interbank payments.

If the deblocking of both types of messages cannot result in the execution of all payments still remaining in the waiting queue at that moment, all cross-border payments are deleted from the waiting queue.

Payments related to monetary policy (orders in favour of the deposit account and/or monetary reserves account) may be presented until 6.30 pm.

All domestic payments still in the waiting queue at the closure of ELLIPS will be deleted at that time. Under normal circumstances, ELLIPS closes at 7 pm.

Table 1
ELLIPS time schedule

Operations	Schedule
– ELLIPS opening time	6.30 am
– Payment orders validation controls	6.30 am - 7 am
– Start of payments settlement	7 am
– Cutoff time for transfers agreed on day J-n	9.30 am
– Cutoff time for customer payment orders (MT100/103)	5 pm
– Cutoff time for interbank payment orders (MT202)	6 pm
– Cutoff time for orders in favour of the deposit account and/or the monetary reserve account	6.30 pm
– ELLIPS normal closing time	7 pm
– Treasury module closing time	7.30 pm

3.2.5 Transaction processing environment

Data exchanges between ELLIPS and its members take place exclusively via telecommunication links through the SWIFT network.

ELLIPS has two different types of business continuity environments. The first continuity environment (secondary site) is located in Brussels near the “live system” (first site). It can take on processing in the event of a failure of the primary system by using a mirrored database and fully redundant public utilities. The second continuity environment (third site) is located 35 km from the main centre in Brussels. The database in the second continuity environment has been rebuilt on the basis of database D-1, to which the DB2 logging of D, which is continuously sent to this site, is applied.

3.2.6 Settlement procedures

Each transfer is settled individually by debiting the sender's current account with the NBB and crediting the beneficiary's account. The payments become final immediately (see Section 3.2.4).

3.2.7 Credit and liquidity risk

As ELLIPS is an RTGS system, the payments are settled one by one on the settlement accounts held by the participants with the NBB. If sufficient funds are available on the account of the sending participant, the individual transactions are booked instantly, thus becoming final immediately. Several instruments contribute to ensuring sufficient liquidity: the monetary reserves, free intraday credit guaranteed by collateral, the marginal lending facility and the deposit facility.

3.2.8 Pricing

For domestic payments, each participant pays an annual contribution to cover the fixed costs. The variable costs are shared on the basis of the number and characteristics of the payments. The investment costs, which are not explicitly necessary within the framework of the link between ELLIPS and TARGET, are shared evenly between the participants. Every new participant joining ELLIPS pays an entry fee determined by the Board and based on historical investment costs.

For cross-border payments (TARGET), costs are recovered on the basis of one single tariff per payment, billed to the initiator and based on the number of transactions made by this participant within a single system, according to a degressive scale.

The costs of the treasury module are distributed on the basis of the size of the computer resources used by different types of queries.

3.2.9 The treasury module

An online treasury module provides the participants with a range of information on what has been happening in the payment systems throughout the day. The participant can systematically obtain information on:

- possibilities of credit with the NBB;
- the situation of its current account with the NBB;
- transactions on its current account with the NBB and, more specifically, the ELLIPS payments;
- operations from and intended for other RTGS systems participating in TARGET;
- the situation of the ancillary systems;
- the waiting queue with transactions to be carried out; and
- the waiting queue with transactions addressed to it.

3.3 Retail payment system: CEC

3.3.1 Functioning rules

The CEC is a non-profit-making organisation which was created in 1974. As in the case of ELLIPS, the Board of Directors, made up of representatives of the most important members and chaired by the NBB, takes the decisions on new rules.

The NBB also acts as operational manager of the system.

3.3.2 Participation in the system

According to the organisation's statutes, all credit institutions legally entitled to operate in Belgium as well as the Post, the NBB and some payment organisations (eg Banksys) can make use of the services of the CEC either directly, as members, or through another participant, as sub-members. Direct members must fulfil some financial (minimum risk-asset ratio), operational (technical ability to operate), juridical (legal opinion for members established under a foreign legislation) and volume criteria. All the institutions operating in the CEC must be direct or indirect members of the Clearing House of Belgium.

On 31 December 2001 the CEC comprised 33 members and 61 sub-members.

3.3.3 Types of transactions handled

The CEC is only used for exchanging retail payments. The main categories of operations include credit transfers for up to EUR 500,000, truncated cheques for up to EUR 10,000, unpaid cheques, direct debits, unpaid direct debits, bills of exchange, loading operations of e-purses and ATM/POS transactions. The latter category represents approximately 38% of the total number of operations.

In 2001 the CEC processed a daily average of 3.6 million operations (with a maximum of 7.7 million) for an average amount of EUR 2 billion. The six largest participants accounted for almost 84% of the total number of transactions handled by the system.

3.3.4 Operation of the transfer system

The CEC system operates on a round the clock basis, five days a week, and on Saturday from 9 am to 5 pm without cutoff. The remitting institution generates files of messages to be sent under different application codes, according to their type. Data are transferred to the CEC via telecommunication or, although very rarely, via magnetic media in backup situations. There is no exchange of paper payment documents (including cheques), as these are retained (truncated) by the institution that receives them from the customer. Following certain checks, the messages are sorted by addressee and then sent. The participants can enquire about their treasury positions via telecommunication throughout the day. Participants cannot revoke their operations once they have confirmed them.

Table 2
CEC time schedule for settlement on D-day

Operations	Cutoff times
Direct debits and unpaid direct debits	D: 10.30 am
Credit transfers	D: 1.30 pm
Bills of exchange	D: 1.30 pm
Cheques and unpaid cheques	D: 2.15 pm
Higher-value ¹ or urgent credit transfers	D: 3 pm
Daily cutoff	D: 3.15 pm

¹ Value between EUR 125,000 and EUR 500,000.

The settlement of the data exchanged after these deadlines takes place on the next value date.

3.3.5 Transaction processing environment

Data exchange between the CEC and its members takes place via telecommunication with compulsory encryption. Data are handled via teleprocessing, and magnetic media are only used as backup. The CEC operates with a very high degree of reliability. Immediate contingency facilities exist both within the NBB and in an external backup centre.

3.3.6 Settlement procedures

The settlement of the CEC balances is net and multilateral. The amounts to be cleared as a result of the exchanges are calculated for each member and settled on a current account at the NBB. This account can be either that of a settlement bank (ie an ELLIPS participant) or the member's own account. All exchanged payments are settled on the same day, provided they have been remitted before the cutoff time.

3.3.7 Credit and liquidity risk

The CEC multilateral net balances are settled through ELLIPS participants. Risks are also limited on account of the participation criteria (see Section 3.3.2) and a maximum unit value per type of operation.

3.3.8 Pricing

The cost of the CEC system is shared between its members on the basis of transaction volumes, so that the NBB's costs are fully covered. The direct members also have to pay a fixed annual fee. In addition to these system costs, an interbank pricing system exists according to which every receiving bank pays a certain sum to compensate for the remitter's data exchange costs.

3.3.9 Main projects and policies being implemented

In the future, the CEC will most likely process all retail transactions, including those that are still exchanged in the manual clearing house. This goal should be reached by modernising some paper-based payment instruments and by using new technologies, such as those which allow the processing of images.

The third generation of the CEC, CEC III, will be operational in September 2004. CEC III was desirable because of technological innovations and to meet possible future developments such as image processing, and the need to handle several settlements a day. The new CEC III will also be better prepared for the single euro payment area (SEPA).

3.4 Paper-based system: Clearing House of Belgium

The Clearing House of Belgium (an association without a specific legal structure) is governed by a Board of Directors composed of representatives of the most important member institutions and chaired by the NBB, which also acts as system operator. The Board determines the operating rules. The statutes of the association require the approval of the General Assembly, in which each participant has a voting right. All credit institutions (plus the Post and the NBB) legally active in Belgium can participate in the Clearing House of Belgium.

On 31 December 2001 the Clearing House comprised 32 direct participants and 52 indirect participants.

The Clearing House of Belgium only handles cheques of more than EUR 10,000. The total value of the operations processed by the Clearing House of Belgium is marginal compared to that of the ELLIPS transactions. In 2000 their daily average value amounted to approximately EUR 360 million for a daily average volume of 15,000 payments.

The Clearing House of Belgium processes paper-based transfer orders within and between its various branches (by post or courier service). The announcement and remittance of operations are accepted from 8 am to 11.45 am; the sorting of envelopes by the staff of the Clearing House ends at 12.15 pm, and the withdrawal and confirmation of operations take place between 12.15 pm and the system cutoff time at 3 pm. Operations cannot be revoked unless there is a bilateral agreement in place. Payments become final on the same day.

Table 3
Time schedule of the Clearing House of Belgium

Operations	
Opening	9 am
Announcement and remittance	11.45 am
Sorting	12.15 pm
Withdrawal and confirmation	3 pm
Daily cutoff	3 pm

The operating rules of the Clearing House were modified considerably following the launch of the ELLIPS system. The few remaining paper-based operations are physically exchanged using mailboxes installed on the premises of the NBB, without the compulsory presence of the credit institutions' representatives, while the related financial data are announced via telecommunication either in the Clearing House or at the member banks' head offices. Operations are confirmed electronically by the addressee on receipt of the payment documents.

At the end of the day, the net balances of each participant are automatically settled on a current account at the NBB. This account can be either that of a clearing bank (ie an ELLIPS participant) or the participant's own account. All exchanged operations are settled on the same day.

Since the Clearing House of Belgium is an ancillary system like the CEC, the multilateral net balances are settled through ELLIPS participants. Risk is also limited on account of the participation criteria (see Section 3.4.2).

The cost of the Clearing House of Belgium is borne by the participants on the basis of the number of envelopes exchanged and the use of the computer application and courier services.

4. Securities settlement systems

4.1 Trading

4.1.1 Off-exchange market in linear bonds, strips and Treasury certificates

The off-exchange market in linear bonds, strips and Treasury certificates was established as a regulated market in the sense of the EC Directive on investment services by the Royal Decree of 22 December 1995. The Royal Decree delimits the market, regulates access to it, grants certain categories of legal persons the exclusive right to act as professional intermediaries, determines regulatory and supervisory tasks and, finally, regulates the provision of information to the public. The Committee of the Securities Regulation Fund is the first-level market authority. The BFC is responsible for the second-level control of the Belgian market authorities.

The majority of the secondary market transactions are OTC transactions. This market is sustained by a team of primary dealer market-makers (around 15) appointed by the Belgian Treasury with an obligation to act as market-makers.

Since September 1999 some Belgian long-term dematerialised public debt securities have also been traded on EuroMTS, a pan-European electronic trading system for euro-denominated benchmark government bonds. EuroMTS works through the Telematico system, an electronic trading platform of Italian origin launched in 1988. This system only handles the most liquid domestically issued instruments on a real-time and price-driven basis.

Following the example of Italy, France, the Netherlands and Portugal, Belgium also decided to adopt the MTS technology for its domestic market as from May 2000, through a new purpose-made entity called MTS Belgium (75% of the shareholding's structure is in the hands of the primary dealers in Belgian public securities). The technology used by MTS Belgium is the same as that of EuroMTS, but with a domestic scope in terms of the securities treated (including all long-term and short-term bonds).

The bulk of OTC transactions, including EuroMTS and MTS Belgium transactions, are settled through the NBB's SSS (see Section 4.3.1, *NBB-SSS*).

4.1.2 Euronext Brussels

Legal and institutional aspects

On 22 September 2000 the exchanges of Paris (Bourse de Paris), Amsterdam (AEX) and Brussels (BXS) merged, becoming fully owned subsidiaries of Euronext NV, a Dutch-incorporated *structuur regime* holding company. The Euronext merger has created a single organisation with one line of command for the three exchanges. Euronext NV has a two-tier board structure consisting of a Managing Board and a Supervisory Board. The three members of the Managing Board are appointed by the Supervisory Board. The Managing Board is responsible for the company's general policy and for making decisions on the principles for the organisation of the markets and the clearing and settlement of transactions. Since mid-2001, Euronext NV has itself been listed on the Euronext Paris exchange.

Euronext is creating a fully integrated cross-border stock and derivatives trading market, with one trading system, one central order book and a single set of trading rules. Since November 2001 cash market transactions have been conducted on a single trading platform, the Nouveau Système de Cotation (NSC), which was already being used in Paris. Furthermore, derivatives trading and clearing and settlement will be integrated (see also below).

From a regulatory point of view, the three exchanges will still be regulated markets recognised in their national jurisdictions, but national rules (eg listing requirements, membership, enforcement trading and surveillance) will be harmonised. As far as Belgium is concerned, the main legislation for the stock exchange markets is stipulated in the Law of 6 April 1995 relating to secondary markets. The Euronext Brussels Rule book has been formally established by the Euronext Brussels Managing Board and has to be approved by the Belgian Minister of Finance, on the advice of the BFC. It comprises both harmonised rules, eg the membership rules, and, in a transition period, local Euronext Brussels rules. The BFC has since 2002 acted as the market authority for Euronext Brussels. It concluded a

memorandum of understanding with the market authorities of the French and Dutch Euronext markets regarding the regulation and supervision of Euronext.

Operational aspects

Cash markets

The cash markets comprise four markets. The trading rules are harmonised for the Euronext cash markets. Most securities are traded on the *primary market*, where shares, bonds, loans and rights offered by listed companies are quoted. The primary market is subdivided into the continuous market and the auction or fixing market. The most liquid securities are grouped on the continuous market. Price fixing on the continuous market takes place on a continuous or semi-continuous basis, whereas, on the fixing market, price fixing takes place once or twice a day. The markets are order-driven, and trading takes place on an anonymous basis.

The *secondary market* is mainly a market for real estate certificates, operating as an auction market. *EURO.NM Belgium* aims at financing innovative companies with a high growth potential. On the trading facility market are traded financial instruments already negotiated on another, regularly functioning, recognised and public market.

All these markets are regulated markets in the sense of the EC Directive on investment services. Some market members act as specialists, with obligations regarding orders and price spreads in selected stocks, thus providing liquidity.

Trading hours are currently from 9 am to 5 pm. As an automated electronic trading and support system is used, trade matching between direct market participants takes place immediately. The stock trades are cleared through Clearnet SA (see Section 4.2).

Derivatives markets

Euronext Brussels derivatives trading takes place on a fully automated market. Brokers can introduce various single-order or spread-order types into the system. They are able to see the best bid at all times, ask about the prices available on the market and check the market depth. The trades are cleared through Clearnet SA (see Section 4.2).

4.1.3 Nasdaq Europe

In March 2001, the US-based Nasdaq stock exchange took over Easdaq, the pan-European stock market that operated independently of any national market. Easdaq was renamed Nasdaq Europe. Its listings primarily include companies in the telecommunications, information technology, software and biotechnology sectors. It provides trading in US-listed equities. Share prices for listed companies are quoted in the currency chosen by the company at the time it applies for admission.

The basic legislation for the organisation and functioning of the market is laid down in the Law of 6 April 1995 on secondary markets, the Royal Decree of 10 June 1996 and the Nasdaq Europe market rules, as approved by the Minister of Finance. Nasdaq Europe market rules are comparable to Nasdaq US rules. Nasdaq Europe is a regulated market in the sense of the EC Directive on investment services. The BFC acts as a market authority.

In June 2001, Nasdaq Europe introduced a new trading system. It is a screen-based, price-driven system which uses a multiple market-maker system, similar to the one used by Nasdaq in the United States, to support continuous trading and ensure liquidity. In a later phase, automatic direct matching of buy and sell orders is envisaged. The market is open between 8 am and 5 pm CET. Market-makers registered for a particular security must purchase and sell securities on their own account and on a continuous basis during normal business hours, entering and maintaining two-sided quotations regardless of business conditions. The quotations must be at least the minimum quotation size. Market-makers' quotations must be reasonably in line with prevailing market prices, although no maximum spread is imposed.

Since December 2001, Nasdaq Europe transactions have been cleared through EuroCCP, the London-based central counterparty and subsidiary of the US clearing house DTCC. EuroCCP has links with the main settlement systems in Europe, including Euroclear, Clearstream and Crest.

4.2 Clearing

4.2.1 Clearnet SA

Institutional and legal aspects

The requirements and principles for the functioning of the clearing house of Euronext Brussels were established by the Royal Decree of 18 August 1999. Furthermore, the clearing house rules require the prior approval of the Minister of Finance. The BFC, responsible for the prudential supervision of the clearing house of Euronext Brussels, and the NBB, as oversight authority, were parties to the memorandum of understanding organising the supervision and oversight of the clearing of the Euronext markets.

The three clearing houses of the French, Dutch and Belgian Euronext exchanges legally merged on 1 February 2001. Trades executed on the Euronext platform are cleared through a single central counterparty, the Paris-based credit institution Clearnet, the former clearing house of Euronext Paris. Clearnet has branches in Amsterdam and Brussels. From an operational point of view, a common clearing system (Clearing 21) is already used for the Euronext Paris and Brussels cash markets. The Amsterdam cash market followed in October 2002.

Operational aspects

Operationally speaking, the clearing (interposition of the central counterparty and netting) of Euronext Brussels cash market instruments takes place through the Clearing 21 system, operated by Clearnet SA.

Derivatives instruments traded on Euronext Brussels (futures, options and index participation units) are still cleared through the legacy system of the former Belfox, now operated by Clearnet SA. Some relevant elements:

- Derivatives clearing members are required to separate in Clearnet's books their customers' position accounts from their own, as well as separating their own accounts from the customers' account of the trading members for whom they execute clearing transactions. Furthermore, netting between individual customers' accounts is not allowed.
- Derivatives positions are updated in real time from matched trade reports and are available for remargining at any time based on the latest prices. Position limits are imposed per contract and per clearing member.
- Margins are required from clearing members with regard to their own and their customers' accounts. Furthermore, and notwithstanding the fact that there is no legal relationship between the clearing house and the clearing members' customers, the derivatives clearing rules stipulate that clearing members must ask for minimum margins from their customers.
- Normally, margin requirements are calculated at the end of each day and are to be settled the following morning before 9.45 am. In order to ensure an adequate and timely clearing process in volatile markets, Clearnet SA can either increase margin requirements or impose intraday margining.
- Clearnet establishes an initial margin for each futures contract. A fixed percentage of the contract value is determined with reference to the maximum anticipated price movement in one day. Option margins are also calculated on a daily basis, taking into account market volatility.
- Futures are marked to market daily at the end of each trading day and subject to daily settlement. Debit margins cause cash payments to be made on the following day before 9.45 am. Option premiums are payable in full on T+1.

Both Euronext Brussels cash stock market transactions and stock options exercises and assignments at expiry are settled in the FMS system of CIK (see Section 4.3).

4.3 Settlement

4.3.1 NBB-SSS

Institutional and legal aspects

Articles 3 and 12a (and the subsequent amendments thereof) of the Law of 2 January 1991 relating to public securities and the instruments of monetary policy established the dematerialised form of public debt as well as the SSS managed by the NBB (NBB-SSS). This settlement system is thus fully owned by the NBB and operated within its Financial Markets Department. These articles were inspired by the general philosophy of Royal Decree no 62 of 10 November 1967, which defined the rules applicable to fungible securities under Belgian law.

Legal measures have also been taken in order to protect the investors' interests, particularly against the default of the holder of a dematerialised securities account, eg the segregation of assets. In this respect, the owners of securities held with the NBB-SSS have co-ownership rights to these securities, and this also applies in the very hypothetical case of insolvency of the NBB. The protection of security holders regarding the irrevocability and the finality of settled transactions (including the event of insolvency of the counterpart) had already been ensured by Article 157 of the Banking Law of 22 March 1993 (as extended by the Royal Decree of 28 January 1998), and was further enhanced by the implementation of the EC Directive on settlement finality under Belgian law (Law of 28 April 1999, amended by the Royal Decree of 18 August 1999).

The Law of 6 August 1993, governing transactions on certain securities, introduces a new tax system for fixed income securities deposited in a settlement system; it also assigns the Treasury the responsibility for the collection and payment of the withholding tax due from certain beneficiaries of securities income.

The Securities Regulation Fund (SRF) is responsible for the supervision of the holding of the accounts of dematerialised public debt securities.

The NBB-SSS has a single category of members, the direct participants, encompassing a very wide range of institutions entitled to apply for membership: credit institutions established in the European Union, stockbroking firms established in the European Union, the Treasury administration, the NBB, Clearstream Luxembourg, Euroclear, Sicovam and other SSSs.

Operational aspects

Each participant joining the system has different accounts for the securities held on its own account, those held on behalf of third parties and those pledged for collateralisation purposes.

The settlement of the cash leg of DVP transactions takes place in central bank money on the participant's current account in the books of the NBB. The participants thus benefit from very close integration of the cash and securities dimensions within one single entity.

Repo transactions in Belgian dematerialised public securities traded either on the Repoclear or on the EuroMTS platforms are cleared within Repoclear, a service provided by the London Clearing House (LCH). Acting as a central counterparty, Repoclear performs a multilateral netting process once a day, taking into consideration all the trades concluded between counterparties which have been sent for clearing. The settlement of the netted movements stemming from Repoclear is subsequently ensured within the NBB-SSS settlement process.

During the course of the day incoming notifications are entered into the system as quickly as possible. As soon as a notification has been registered, the system tries to match it. To this end, the notification of the counterparty must already exist. When both notifications have been entered into the system, all details are compared and the match is successful if no discrepancies are found.

The bulk of the orders, sent to the system via the SWIFT network, are automatically authenticated, subject to an exchange of SWIFT keys between the NBB and the participant involved.

Participants located in Belgium can also use a secured IT communications network (developed by the Belgian banking community) to send their orders to the settlement system.

In order to reduce the risks relating to errors or omissions on the part of the counterparties, the system regularly updates the status details of participants' notifications. The participants can verify the status of their instructions online and react in the event of mismatched instructions.

Several definitive batches (about 10 batches a day) are run throughout the working day. Each of these batches performs gross settlement of the eligible notifications, meaning that each transaction gives rise to the simultaneous settlement of one cash and one securities movement (BIS DVP model 1). In other words, the process checks the effective provision of cash (for the buyer) and of securities (for the seller) before settling the relevant transaction.

The batches are run between 8 am and 4.15 pm for FOP and DVP transactions; additional batches may occur between 4.15 pm and 6 pm but only on an FOP basis and for the sake of collateral transactions involving one NCB of the Eurosystem.

Each of these batches starts at a predetermined time and tries to settle the selected transactions, provided there is sufficient cash and security provision. Those transactions not selected (owing to a lack of securities/cash or to other selection criteria) remain in the queue and are examined again when the next batch is run.

The admission requirements regarding the successive batches are determined in such a way that the criteria become increasingly broader throughout the day.

The option of an automatic securities lending facility is offered to the direct participants. This facility enables holders of securities who have no immediate need for them to lend them to other participants. The lent securities are covered by a pledge of securities taken by the system from the borrower's own holdings (full collateralisation basis). These loans are granted without direct intervention of the lenders and borrowers. The automatic securities lending process is undertaken at the end of the last DVP settlement batch of the day, scheduled to be completed at 4.30 pm. The repayment procedure is also automated.

The system operates according to the pooling principle whereby a number of lenders make securities available to participants who need them to settle their planned transactions. This process is fully confidential, with the identity of the lenders not being revealed to the borrowers and vice versa. The automatic securities lending works in such a way as to guarantee fair distribution of the loans in the long run in terms of amounts offered by each potential lender.

The fee structure includes the following elements:

- a monthly flat rate fee as well as a monthly custody fee per participant identification number in the system;
- a half-yearly lump sum to cover the cost of consultation facilities; and
- a notification/movement fee per sent order.

The international holding and trading of Belgian public debt securities have also been simplified as a result of the links established with the NBB-SSS by other SSSs, ie Clearstream Luxembourg, Euroclear (since 1991) and Sicovam (since 1999).

4.3.2 CIK

Institutional and legal aspects

The CIK is a limited liability company under public law, established under the terms of Royal Decree no 62 of 10 November 1967, facilitating circulation of securities. It is located in Brussels. The CIK was recognised and its articles of association were modified and approved by the Royal Decree of 3 September 2000. Its general rules were approved by the Minister of Finance on the same date. The CIK is managed by its Board of Directors.

In 1999 the CIK became a fully owned subsidiary of the Brussels stock exchange (Euronext Brussels). In July 2001 the Euroclear and Euronext groups agreed that the settlement activities of Necigef and CIK, the Dutch and Belgian CSDs, would be absorbed by Euroclear. Euroclear will thus become the preferred settlement partner of Euronext.

The accession rules are laid down in Article 2 of the CIK's by-laws. Any professional authorised to handle stock exchange orders as well as any foreign SSS may become a member (affiliate) of BXS-CIK. Issuers are not admitted.

Affiliates can cancel their membership by giving at least one month's notice by registered letter. The affiliate's liabilities to the CIK end when the affiliate has settled all of its accounts. Any affiliate which does not respect the decisions of the General Assembly or the Board of Directors or, more specifically, the terms of the by-laws, or which, in particular, issues transfer or withdrawal orders for which its account has insufficient funds, may be excluded by the Board of Directors following a summons by registered letter or a hearing. The affiliate shall be notified of the decision of exclusion by registered letter at least 15 days before the decision becomes effective.

The Minister of Finance is represented by a government commissioner who attends Board meetings. The NBB's oversight responsibilities cover the settlement activities of the CIK.

Operational aspects

The CIK acts as a central depository for Belgian private sector securities. As a custodian, it also provides safekeeping for bearer certificates and other related services: payment of principal, interest and dividend in direct participants' accounts, as well as notification of corporate actions. The CIK is also the Belgian National Numbering Agency.

The CIK operates a settlement system in which both stock exchange (Euronext Brussels) transactions and OTC trades are settled.

Eligible securities

Eligible securities for custody services and transfers must be fungible. This covers listed Belgian shares, warrants, bonds and rights as well as foreign listed bonds and shares. Dematerialised private corporate bonds are also eligible. Any unlisted fungible instruments can be eligible upon the agreement of the Board of Directors. Instruments eligible in the CIK are either in dematerialised form (money market instruments and private corporate bonds) or in bearer form (corporate bonds, shares, etc), of which approximately 50% are issued as global certificates, while another 40% are immobilised. Since the implementation of the Law on the Belgian Financial Architecture (BELARFI) in 1998, the CIK has no longer been able to hold positions on accounts for securities issued by the Belgian public sector.

Settlement

Both cash and forward market on-exchange transactions are settled through the CIK's FMS system. OTC transactions are settled through the electronic matching and securities settlement (EMSS) system.

Notifications in the CIK system are SWIFT-based messages and are exchanged via the SWIFT network. A CIK-dedicated workstation (Satelit/Elit) can also be used.

Default procedures

In the event of default (eg bankruptcy), the defaulting participant will be disconnected and will not be allowed to enter into new transactions. Other participants will be informed by official notification.

In the event of bankruptcy, transactions will be settled up until the moment of declaration or official notification by the administrator. The Law of 28 April 1999 transposed into Belgian law Directive 98/26/EC on settlement finality in payment and securities settlement systems. Transfer orders and netting are enforceable and, even in the event of insolvency proceedings against a participant, are binding on third parties, provided that transfer orders had been entered into a system before any such insolvency proceedings were initiated.

– Settlement asset

The CIK does not maintain cash accounts for its participants. The cash accounts are held at the NBB. The cash leg of the transaction is settled in central bank money. Cash settlement is carried out in euros.

– FMS system settlement

All cash market transactions in securities listed on Euronext Brussels, and stock options exercises and assignments, are settled through the FMS system. Since December 2000, settlement has been rolling on a T+3 basis. For on-exchange transactions Clearnet SA interposes itself as a central counterparty between the buyer and the seller.

The CIK organises a DVP settlement based on DVP model 1 according to the 1992 BIS report on “Delivery versus payment in securities settlement systems”. Settlement in the FMS system takes place by means of a batch process for securities and cash, seven times a day between 6 am and 5 pm. The FMS system settles the securities based on a balance per value and per clearing member. The cash settlement is based on a balance per clearing member (identified by its BIC code) per settlement processing cycle. The payment instructions received are processed in real time in the cash accounts of the clearing members held at the NBB. If, and only if, the cash payment is executed, the securities positions of the buyer that were previously blocked are immediately released.

– EMSS system

Matching module

The EMSS provides a real-time matching module, where both buyer and seller introduce the details of their OTC trade. When the trade is fully matched, the transaction is ready for settlement. When the instructions do not match, participants receive a message informing them that the transactions are either unmatched or mismatched.

Settlement module

The EMSS module settles OTC transactions on a trade by trade (gross) basis. It settles DVP transactions on a daily basis from 6 am to 3.15 pm. EMSS also processes FOP transfers of securities. The latter can take place from 6 am to 4 pm.

The EMSS-DVP system is a DVP model 1 system according to the 1992 BIS report on “Delivery versus payment in securities settlement systems”. Securities transfers are processed in the CIK, cash transfers are processed in the NBB, with the two systems being linked in accordance with an agreement between the CIK and the NBB.

The cash delivery instruction sent to the NBB will only be initiated by the reservation of the securities involved in the transaction on a blocked account. The process of cash delivery cannot be initiated in the event of failure on the seller’s side. The reciprocity of the cash and securities transfers is guaranteed as reserved securities are only released upon receipt of the confirmation of payment sent by the NBB. In other words, the buyer is never able to use the securities reserved on his/her account.

The release and the irrevocable and final transfer of these reserved securities to the buyer’s account are guaranteed by the payment confirmation from the central bank.

Since October 1999, transfers have been performed on a continuous real-time basis, both for securities in the CIK and for the payment instruction in the NBB’s payment system. The transactions which are not processed at the end of the day are recycled for settlement on the following day.

Custody

Royal Decree no 62 of 10 November 1967 introduced the circulation of securities through book entry transfers and provided for the fungibility of all securities admitted to operations within the CIK. It stipulates a specific custody regime. The CIK is not entitled to any property rights over the securities deposited. There is no possibility of overdrafts on a CIK participant’s securities account. The holder of a security held with the CIK is granted co-ownership rights to like securities. In this respect, the BELARFI Law of 15 July 1998 explicitly provides for the right of recovery in the event of insolvency of the CIK. Furthermore, the separation of own accounts from customer accounts is mandatory for the accounts held with the CIK by its participants.

Links

With regard to the links, the CIK has signed an agreement with SEGA (Switzerland’s CSD), stipulating that the CIK is a participant in SEGA. The CIK has also signed agreements with three other foreign CSDs, namely with Clearstream Banking Frankfurt (Germany), Euroclear France (France) and

NECIGEF (the Netherlands), as well as an agreement with Euroclear in which both parties are reciprocal participants. These links with the CSDs are established for FOP transfers of securities (equities) listed on Euronext Brussels. The Euroclear link can be operated as a DVP link.

4.4 Use of the securities infrastructure by the central bank

Generally speaking, the NBB makes use of the SSSs located in Belgium for two main purposes: the holding and management of its own securities portfolio, and the management of the collateral offered to it by counterparts for the sake of monetary policy operations or the coverage of intraday credit facilities.

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List of abbreviations

ABM	automated banking machine
ACSS	Automated Clearing Settlement System
ACV	Aggregate Collateral Value
ASE	Alberta Stock Exchange
ASO	additional settlement obligation
ATB	Alberta Treasury Branches
ATS	alternative trading system
BEA	Bills of Exchange Act
BNDS	Bank Note Distribution System
BoC	Bank of Canada
CDCC	Canadian Derivatives Clearing Corporation
CDN	Canadian Dealing Network
CDNX	Canadian Venture Exchange
CDS	Canadian Depository for Securities
CIPF	Canadian Investor Protection Fund
CLS	continuous linked settlement
CLSB	Continuous Linked Settlement Bank
CP Act	Canadian Payments Act
CPA	Canadian Payments Association
CSA	Canadian Securities Administrators
CUCC	Credit Union Central of Canada
CVMQ	Commission des valeurs mobilières du Québec
DCS	Debt Clearing Service
DTCC	Depository Trust & Clearing Corporation
IDA	Investment Dealers Association of Canada
IDB	inter-dealer broker
IDP	Interac Direct Payment
IFIC	Investment Funds Institute of Canada
LVTS	Large Value Transfer System
MFDA	Mutual Fund Dealers Association of Canada
NASD	National Association of Securities Dealers Inc.
NYSE	New York Stock Exchange
OSFI	Office of the Superintendent of Financial Institutions
PAC	Payments Advisory Committee
PCSA	Payment Clearing and Settlement Act
SAC	Stakeholder Advisory Council
SCD	Shared Cash Dispensing
SRO	self-regulatory organisation

Canada

SSS	Securities Settlement Service
TSE-RE	Toronto Stock Exchange Regulation Services Inc
VSE	Vancouver Stock Exchange

Introduction

Regulatory responsibility for payments in Canada is shared by the Bank of Canada and the Ministry of Finance. The Bank of Canada has responsibility for oversight of payment and other clearing and settlement systems for the purpose of controlling systemic risk. The Minister of Finance has oversight powers respecting the Canadian Payments Association as well as payment, clearing and settlement systems that it designates for oversight. The two bodies coordinate oversight activities through a non-statutory body called the Payments Advisory Committee (PAC).

The Canadian Payments Association (CPA), established in 1980, is a not-for-profit organisation with membership open to deposit-taking and non-deposit-taking financial institutions. The CPA has a mandate to establish and operate systems for clearing and settling payments, to interact with other such systems and to facilitate the development of new payment technologies. Under this mandate, the CPA owns and operates the two national payment systems: the Large Value Transfer System (LVTS) and the Automated Clearing Settlement System (ACSS).

The LVTS, Canada's principal system for clearing large-value and time-sensitive payments, began full operations in February 1999. It is an electronic credit transfer system that provides real-time net processing and intraday finality for payments. The risk management arrangements in place ensure that payments are final and irrevocable in the event of a default by one participant, the largest net debtor, or more participants.

The ACSS was introduced in 1984 to succeed the previous system. With the introduction of the LVTS, it is now primarily a retail payment oriented system. The ACSS is a deferred net settlement system that clears and settles electronic payments and paper-based payments, such as cheques, in Canada.

For both the LVTS and the ACSS, access to the systems is tiered, with CPA members entering through those members that participate directly in the systems. Settlement occurs across accounts maintained by these direct participants at the Bank of Canada. The LVTS is by far the larger system by value, accounting for approximately 84% of the total value of payments cleared and settled.

Canadians have a wide variety of options to make cashless payments. Cheques continue to be important although their usage for large-value payments has declined significantly since the commencement of the LVTS. On the retail level, cheques continue to be used but there has also been strong growth in electronic payment methods, such as paying bills over the telephone or internet, and in debit and credit card payments.

In Canada, the most prevalent credit card networks are the Visa and MasterCard schemes. The only Canadian nationwide debit card network is offered by the Interac Association. Interac offers two services: a shared network for cash dispersion from automated banking machines (ABMs), and a shared network to allow debit cardholders to pay for purchases at the point of sale (EFTPOS). Both services are widely used and accepted by Canadians.

There are two main equity markets in Canada, both of which use electronic trading systems: the Toronto Stock Exchange and the TSX Venture Exchange (TSX). The Toronto Stock Exchange is a modified auction order-driven market focused on "senior" equity issues. It is the largest exchange in Canada. The TSX Venture Exchange is a small market focused primarily on small and emerging companies. The Bourse de Montreal, a continuous auction order-driven market, is Canada's principal market for exchange-traded derivatives products.

The fixed income market in Canada is highly decentralised and institutional in nature. Trading between dealers and clients is typically quote-driven, taking place bilaterally over the telephone. The inter-dealer market is dominated by four brokers.

Regulation of the securities industry is carried out by provincial securities authorities. Some aspects of regulation are delegated to self-regulatory organisations. The most important are the exchanges already mentioned and a national body of investment dealers called the Investment Dealers Association (IDA).

There are two systems for clearing and settling securities transactions: the Debt Clearing Service (DCS) and the Securities Settlement Service (SSS). Both are owned and operated by the Canadian Depository for Securities Limited (CDS), which is itself owned by commercial banks, members of the IDA, and the Toronto Stock Exchange. By value, the DCS is the larger of the two systems.

The DCS facilitates the clearing and settlement of all Canadian dollar-denominated debt securities. It can be described as a model 2 delivery versus payment mechanism: transactions are settled with

securities ownership moving on a gross basis in real time while funds positions are calculated and settled at the end of the day via the LVTS. The risk containment arrangements in place ensure that the DCS is able to settle given the failure of the participant with the single largest net obligation to CDS.¹ The system is designated for oversight by the Bank of Canada.

The SSS facilitates the clearing and settlement of equity and US dollar-denominated debt securities. It is by far the smaller of the two systems with respect to the value of transactions handled. The system completes three cycles each day. At the end of each cycle, securities positions are moved on a gross basis and cash payments are netted and completed via designated paying agencies. Canadian funds settlement is completed through the ACSS while US funds settlement is completed through Fedwire. The SSS does not operate in real time and does not have risk containment arrangements as robust as those in the DCS. Plans are currently under way to move the clearing and settlement of these items to an enhanced DCS in 2003.

The Bank of Canada interacts in the payment and securities, clearing and settlement systems in various ways. First, the Bank of Canada oversees the LVTS, the DCS and the Canadian dollar leg of CLS Bank operations for their potential to pose a systemic risk. Second, the Bank provides a settlement account to each of the CPA members that participate directly in the ACSS and the LVTS. Settlement is completed across these accounts. Third, the Bank provides collateralised overdrafts to these same participants to fund end-of-day obligations in these systems if necessary. Fourth, the Bank accepts collateral and provides various collateral services in support of LVTS intraday operations, and advances. Fifth, the Bank acts as the settlement agent for CDS with respect to the DCS, making and receiving payments on CDS's behalf through the LVTS. The Bank also acts as banker for CLS Bank, providing it too with a settlement account and making and receiving LVTS payments on its behalf. Finally, the Bank of Canada is a member of the CPA and participates directly in the LVTS and the ACSS. The Bank is also a participant in the DCS.

Overall, the Bank of Canada has a responsibility towards promoting the economic and financial welfare of Canada. In doing so, the Bank contributes to the regulation of payment and other clearing and settlement systems in order to control risk to the Canadian financial system and to promote its efficiency and stability.

1. Institutional aspects

1.1 The general institutional framework

The general legal and regulatory framework governing the payment and other clearing and settlement systems is discussed first followed by a description of those institutions eligible to participate in the Canadian payment system.

1.1.1 The legal and regulatory framework

The general legal framework for the Canadian payment system involves "public" laws as well as "private" laws. Public laws are rules that have compulsory application by statute and are designed to promote the public interest. They include the Canadian Payments Act, the Payment Clearing and Settlement Act, the Bank of Canada Act, the Bank Act, the Bills of Exchange Act, provincial securities laws, federal insolvency laws, and federal and provincial consumer protection laws.

Private laws are those rules that establish the legal framework of voluntary arrangements and are created to define and promote individual responsibilities and rights. These laws include property law, commercial law and contract law. They relate, among other things, to the autonomy of contracting parties, the liability for contractual commitments, and good faith in mutual relations. For example, the deposit agreements and payment service contracts between individuals and their deposit-taking institutions, as well as the membership criteria, by-laws, procedural rules and operating standards of

¹ See Section 4.2.1. The DCS will settle even given the failure of the largest extender of credit in the system.

Interac, Visa and SWIFT, are legally validated through private law. However, the by-laws and procedural rules of the CPA, which is a statutory body, are defined under both public and private laws.

The most relevant laws and voluntary standards are discussed below.

The Canadian Payments Act (CP Act)

The CP Act establishes the role of the Canadian Payments Association (CPA) and the Minister of Finance in the Canadian payment system. The Act gives certain oversight powers to the Minister of Finance respecting the payment systems and the CPA. See Section 1.3.1 for more on the role of the Minister of Finance.

The legislation gives the CPA board of directors the power to make by-laws (which require the approval of Governor in Council) and rules that set out the procedures and standards governing the daily operations of participants in its national clearing and settlement systems. Among the items covered in the by-laws are the organisational structure of the clearing systems; the general procedures for the clearing of payments and their subsequent settlement on the books of the Bank of Canada; the description of which classes of items are eligible for clearing in the national system; and the definition of the rights and responsibilities of member institutions. These rules and by-laws can be considered to form the operational backbone of the national clearing and settlement system. See Section 1.3.2 for more information on the CPA.

The Payment Clearing and Settlement Act (PCSA)

The PCSA, which was proclaimed in July 1996, gives the Bank of Canada responsibility for the oversight of payment and other clearing and settlement systems in Canada for the purpose of controlling systemic risk. The Bank designates those systems with the potential to create systemic risk as being subject to the PCSA and oversees designated systems on a continuing basis for the appropriate control of systemic risk.² The PCSA also contains provisions that, when combined with federal insolvency legislation, reinforce the legal enforceability of netting in designated systems. In addition, the PCSA contains provision to ensure that the settlement rules of designated systems are immune to legal stays or other challenges, even in cases where a participant in one of these systems fails. Thus, the PCSA increases the certainty surrounding the legal arrangements governing the operations of designated clearing and settlement systems.

The Bank of Canada Act (BoC Act)

The BoC Act, by governing the powers and activities of the central bank, has an important influence on the institutional framework of the Canadian payment system. Under the BoC Act, the Bank is the sole issuer of notes in Canada. The Bank may open accounts for commercial banks and other members of the CPA, and these accounts are used to effect the final settlement of payment liabilities in the national systems. The Bank of Canada is authorised to make loans or advances, on a secured basis, to banks and other members of the CPA. In this way, the Bank serves as an ultimate source of liquidity for the payment system.³

Acts governing exchange

The Bills of Exchange Act sets out the statutory framework governing cheques, promissory notes and other bills of exchange. The Act deals with matters such as what constitutes a valid bill of exchange and the rights and obligations of various parties to a bill, including provisions establishing liability in the event of fraud or forgery, and responsibilities in the event of the loss of an instrument.

The Depository Bills and Notes Act allows clearing houses or depositories to transfer depository bills or notes, such as bankers' acceptances, from seller to buyer through book-entry transfers.

² The PCSA directs the Bank to be concerned with the oversight of clearing and settlement systems, rather than the regulation of a particular financial market or the supervision of the affairs of individual financial institutions that may be members of these systems. Any matter that is not directly related to an institution's participation in a designated clearing and settlement system is not subject to the Bank's oversight under the PCSA.

³ In addition to banks and members of the CPA, the Bank can make loans to a designated clearing house under the PCSA.

Federal and provincial financial institutions statutes

The federal financial institutions statutes (Bank Act, Trust and Loan Companies Act, Cooperative Credit Associations Act and Insurance Companies Act), coupled with legislation governing provincially incorporated financial institutions, provide the statutory underpinnings of the Canadian financial system. These statutes regulate such things as corporate ownership and business powers, and define many aspects of the relationships between financial institutions and their customers, the government and some government agencies.

Governed by the Office of the Superintendent of Financial Institutions Act, the Office of the Superintendent of Financial Institutions (OSFI) is responsible for regulating and supervising federally chartered financial institutions, which includes many of the financial intermediaries which provide payment services. OSFI administers the various federal financial institutions statutes and, in carrying out its responsibilities, OSFI identifies institution-specific risks and intervenes in a timely manner to minimise losses to depositors and policyholders.

The various provincial securities commissions regulate and oversee different aspects of the securities industry and capital markets in Canada. For example, the Ontario Securities Commission administers and enforces the Ontario Securities Act, and the Commission des valeurs mobilières du Québec administers and enforces the Quebec Securities Act. Some provincial securities commissions are involved in the oversight of certain clearing and settlement systems, such as the Canadian Depository of Securities and the Canadian Derivatives Clearing Corporation.

The Code of Practice for Consumer Debit Card Services (the Code)

The Code of Practice for Consumer Debit Card Services is voluntary and not legally binding on those organisations that endorse the Code. The Code was developed through consultation among consumer groups, financial institutions, retailers and government, with the intent of establishing minimum levels of consumer protection in debit card arrangements. The Code applies to services that use debit cards and personal identification numbers (PINs) to access automated banking machines, point of sale terminals and debit card terminals. The Code outlines the responsibilities of card and PIN issuers; establishes content guidelines for cardholder agreements and standards for record-keeping and the recording of transactions; contains provisions dealing with security and liability for loss in the event of unauthorised use; and defines procedures for the resolution of disputes.

1.1.2 Financial intermediaries providing payment services

Traditionally, access to membership in the CPA, and hence to the payment system, in Canada has been restricted to deposit-taking financial institutions. These institutions typically accept deposits that are transferable by order to a third party, ie chequable deposit accounts. The deposit-taking sector consists of commercial banks, cooperative credit institutions, trust and loan companies, and governmental savings institutions. Non-deposit-taking financial institutions had been users of the payment services provided by the deposit-taking institutions rather than providers of payment services themselves. However, as of November 2001, the list of organisations eligible for CPA membership under the CP Act was expanded to include: life insurance companies; securities dealers that are members of the Investment Dealers Association of Canada or the Bourse de Montreal; and money market mutual funds.⁴

Commercial banks

Commercial banks, originally called "chartered" banks, were established early in the 19th century primarily to serve the commercial, industrial and governmental sectors of the Canadian economy. During the past 35 years, they have competed aggressively with other financial institutions in the market for personal financial services.

⁴ On 1 June 1992, a new legislative framework for federal financial institutions came into force with the proclamation of the Bank Act, the Cooperative Credit Associations Act, the Trust and Loan Companies Act, and the Insurance Companies Act. Under the new legislation, federal financial institutions are now able to offer most kinds of financial services either directly through subsidiaries, or as an agent through a networking relationship. For an overview of this legislative framework, see Daniel, F, C Freedman and C Goodlet (1992-93): "Restructuring the Canadian financial industry", *Bank of Canada Review*, Winter.

As of December 2001, there were 14 domestic banks, 33 foreign bank subsidiaries, and 14 foreign bank branches in Canada. The six largest domestic banks account for approximately 90% of the banking industry's assets, and operate on a nationwide basis and internationally. The remaining banks primarily concentrate on serving the needs of either a particular region or a particular sector of the economy, and are mostly wholly owned subsidiaries of foreign banks.

All commercial banks are federally incorporated and operate under the provisions of the Bank Act. This federal act regulates various aspects of the organisation and activities of the banks, such as their incorporation, ownership, corporate governance, and business powers. Under the Act, the federal government is responsible for the regulation of the banking sector and OSFI is the federal agency responsible for supervising all banks in Canada.

Commercial banks accept various types of deposits in domestic and foreign currency from the public, including: accounts payable on demand; personal savings deposits - both chequable and non-chequable - non-personal notice deposits; and fixed-term deposits. Banks make loans to businesses and consumers, make residential mortgage loans and hold a portfolio of securities. Banks also deal in foreign exchange, provide safekeeping facilities and perform various other services. In the instance of the largest banks, these operations are, for the most part, carried out through their extensive network of branches.

Cooperative credit institutions

(a) Local credit unions and caisses populaires

Local credit unions and caisses populaires are cooperative financial institutions owned and controlled by their members. Their ownership and corporate governance are based on cooperative principles and their main purpose is to provide deposit, loan and other financial services to their owner-members. These institutions range in size from small, community-based institutions to large multi-branch operations. As of 30 September 2001 there were 1,635 local credit unions and caisses populaires.

Local credit unions and caisses populaires are incorporated and operate under provincial legislation as autonomous organisations. The legislation typically prescribes the types of investment permitted, required liquidity reserves and other guidelines. In some provinces, an annual audit of the operations of a local credit union or caisse populaire must be performed by outside auditors. Moreover, regular inspections are carried out by provincial government departments or their agents to ensure that local credit unions and caisses populaires are complying with the provisions of the applicable legislation.

Local credit unions and caisses populaires were originally established to encourage saving and to provide loans to members who had difficulty obtaining credit elsewhere. Today, most have adopted a full-service approach and offer a variety of chequing and savings accounts, personal and mortgage loans, small business loans,⁵ commercial credit, traveller's cheques, safekeeping facilities, and automated banking machines.

(b) Provincial centrals

Centrals have been established by local credit unions and caisses populaires as second-tier organisations of the credit union movement to increase the stability of, and provide services to, local member credit unions and caisses populaires.

Centrals are incorporated or registered under provincial legislation - typically a credit union act - and are owned primarily by their member local credit unions and caisses populaires. (A small number of local credit unions and caisses populaires are not, however, members of a central). Each central is also an entity independent of other centrals, whether located in the same or another province, though it might have operational links with them.

The primary functions of centrals are: to provide member local credit unions and caisses populaires with services they could not otherwise provide for themselves; to assist local credit unions and caisses populaires in increasing the efficiency of their operations; and to enhance the effectiveness and usefulness of local credit unions and caisses populaires to their own members. These functions

⁵ For more on the cooperative credit system in Canada, see O'Connor, S (1989): "The evolution of the cooperative credit system in Canada", *Bank of Canada Review*, February.

involve, among other things, the investment of surplus funds of local credit unions and caisses populaires and the lending of funds to those institutions when they cannot meet the local demand for loans, the administration of online computer systems, and the provision of clearing services. Local credit unions and caisses populaires are permitted to invest and deposit their statutory liquidity reserves and other surplus funds with their central, and many do so. To accommodate these funds, centrals offer a range of demand and fixed-term deposit accounts. Funds that are required by a central beyond those provided by its member local credit unions or caisses populaires are obtained by borrowings either from commercial banks or from the national central.

As of 31 December 2001 there were 11 centrals in Canada.

(c) *Federations of centrals*

Two “third-tier” organisations exist to provide centrals and other cooperative organisations with coordinated financial and support services similar to those offered by centrals themselves to their member local credit unions and caisses populaires. The most important service provided by each with respect to payments is that they are members of the CPA, thereby providing their members with access to the Canadian payment system.

The Credit Union Central of Canada (CUCC) was incorporated in 1953 as the Canadian Cooperative Credit Society Limited under the federal Cooperative Credit Associations Act, which is now administered by OSFI. Membership in the CUCC is open to centrals and to other cooperative organisations that meet pre-established criteria.

The Fédération des caisses Desjardins du Québec is incorporated under a law of that province. In 1999, Desjardins consolidated its structure, merging the 11 federations and the Confédération des caisses populaires et d'économie Desjardins du Québec into a single federation.

Trust and loan companies

Trust companies can perform both financial intermediary and fiduciary functions. Under the financial intermediary function, trust companies can accept funds from the public in exchange for their own instruments, such as savings and chequing deposits and guaranteed investment certificates. This aspect of their business is often referred to as the “guaranteed funds portion” and differs little from the deposit-taking business of other deposit-taking institutions. Trust companies are the only corporations in Canada with the power to conduct fiduciary business. Under this function, they act as executors, as trustees and administrators under wills or by appointment, as transfer agents for stock and bond issues, as trustees for bond issues, and in a variety of other agency and trustee capacities.

In June 1992, legislation was passed which permitted banks and federal insurance companies to own trust company subsidiaries. Subsequently, several large trust companies were acquired by chartered banks with the result that the non-bank-owned trust companies now constitute a relatively small segment of the industry.

Loan companies may also accept deposits from the public and issue both short- and long-term debentures. Many loan companies are subsidiaries of commercial banks.

Trust and loan companies may be incorporated under either federal or provincial legislation. Federally incorporated companies are supervised by OSFI. Provincially incorporated trust and loan companies are regulated and supervised by their respective provincial governments, although arrangements are in place for some provincial institutions to be reviewed by OSFI. Trust and loan companies, whether federally or provincially incorporated, must be licensed in each province in which they operate.

As of 31 December 2001 there were 41 trust companies and 11 loan companies in Canada.

Government savings institutions

There are two government savings institutions in Canada - ATB Financial and the Province of Ontario Savings Office.

(a) *ATB Financial (formerly the Alberta Treasury Branches)*

The Alberta Treasury Branches were established in 1938 under the Provincial Treasury Branches Act to provide savings and loan services. The Act established the “Province of Alberta Treasury Branches” as a division of the provincial Treasury Department. However, the Treasury Branches were kept separate from the other operations of the Department.

In October 1997, Alberta Treasury Branches became ATB Financial, a provincial crown corporation, under the authority of the Alberta Treasury Branches Act Chapter A-37.9, 1997 and Treasury Branches Regulation 187/97. ATB Financial operates under a board of directors, and has investment, liquidity and risk standards comparable to other financial institutions.

ATB Financial provides a wide range of financial services to its customers. These services include: chequing and savings accounts; loans; safekeeping facilities; traveller's cheques; money orders and drafts; foreign remittances and money transfers; and mutual funds.

(b) Province of Ontario Savings Office

The Province of Ontario Savings Office was established in 1921. The legislation empowers the Treasurer of Ontario to borrow money by means of deposits in any amounts and from any persons. The Treasurer may open offices for this purpose anywhere in Ontario. The provincial Cabinet may fix the conditions as to interest and repayments that will govern deposits.

The Province of Ontario Savings Office offers chequing and savings accounts, term deposits and germinated investment certificates to its customers. The Savings Office also offers other services, including safekeeping facilities, traveller's cheques and money orders.

Life insurance companies

The Canadian life and health insurance industry provides individual and group life insurance, private sector health insurance (to complement public insurance plans) and annuities (which include private pensions). While the insurance sector has traditionally been focused on life and health insurance products, there is now an increasing focus on wealth management and retirement products.

As of August 2001, Canada's life and health insurance industry comprised 117 firms - 107 stock companies (owned by shareholders) and 10 mutual companies (owned by policyholders), down from a total of 168 companies in 1990.

The federal and provincial governments share jurisdiction over life and health insurance companies. However, federally incorporated companies account for over 90% of the total premium income for the industries. Federal supervision is administered by OSFI. The majority of provinces have agreements with the federal regulator to carry out prudential supervision of provincially incorporated companies on their behalf.

In June 2001, the government passed legislation reforming the regulatory framework governing the financial services industry. It included measures that will allow life and health insurance companies access to the Canadian payment system by becoming members of the CPA. This will also allow them to offer payment services to customers, similar to those offered by banks. Although legally not permitted to issue deposits, life and health insurance companies offer their clients "deferred annuities" which are structured to operate very similarly to term deposits or guaranteed investment certificates.

Securities investment dealers

The Canadian securities industry plays a key role in Canada's financial system, providing a mechanism for raising capital, whether in the form of debt or equity, and a means to channel savings into portfolio investments.

Until the late 1980s, most Canadian securities firms were closely held independent entities. Since the 1987 removal of the restrictions on the ability of federal financial institutions to own securities dealers, commercial banks have acquired all of the large securities firms in Canada and control over 90% of the capital of the securities industry. At the end of 1999 there were 188 securities firms operating in Canada.

All Canadian securities firms are registered by the provincial and territorial securities regulators, which are responsible for the regulation of the industry. The Canadian Securities Administrators is the forum where the provincial securities regulators meet to further the goals of regulatory harmonisation and mutual recognition of standards. The provincial securities regulators delegate some authority to the self-regulatory organisations (SROs), which have a long history of regulating and supervising market intermediation in Canada. The well recognised SROs are the Toronto Stock Exchange, the Bourse de

Montreal, the TSX Venture Exchange and the Investment Dealers Association of Canada (IDA), whose membership includes the majority of firms actively engaged in securities trading in Canada.⁶

Securities firms have traditionally offered their clients “deposit-like” products to facilitate the management of liquid balances and typically pay a competitive rate of interest. These firms can now become members of the CPA and provide payment services to their customers.

Money market mutual funds

The Canadian investment funds industry has been one of the fastest-growing financial sectors in Canada. Over the past 25 years, mutual funds have become a very popular investment vehicle, providing Canadians with the opportunity to participate in the ownership of a diversified range of financial assets, while providing liquidity and ease of administration. The rapid growth in the mutual fund market through much of the 1990s was in response to declining interest rates and attractive returns being posted on equity-related investments.

The first Canadian mutual fund appears to have been established in 1931.⁷ The instrument appears to have evolved from the investment trusts popular in the United Kingdom in the 19th century, and the closed-end investment companies which were popular in the United States early in the 20th century. However, the majority of mutual funds existing in Canada today are structured as trusts and are sold on an open-end basis. Reflecting the portfolio in which the fund invests, mutual funds can broadly be classified into three categories: money market funds, fixed income funds and equity funds.⁸

In Canada, mutual funds are regulated by provincial securities commissions. Some commissions have delegated some supervision to a self-regulatory organisation called the Mutual Fund Dealers Association of Canada (MFDA).

Money market mutual funds, which invest in short-term commercial paper, bankers’ acceptances and treasury bills,⁹ are now eligible for membership in the CPA and can thereby offer payment services to customers.

1.2 The role of the central bank

1.2.1 Operational roles

The Bank of Canada does not own or operate any payment or other clearing and settlement systems, although it is a member of the CPA and a participant in CDS. The Bank does, however, provide the following services.

Provision of a settlement asset

The CPA’s Large Value Transfer System (LVTS) and the Automated Clearing Settlement System (ACSS) use claims on the Bank of Canada to settle net payment obligations among those participants that participate directly in these systems.¹⁰ This is supported through the provision of domestic currency settlement accounts by the Bank of Canada to participants.

Standing liquidity facility

The Bank of Canada provides collateralised advances to the direct participants in the LVTS and the direct clearing members of the ACSS. These advances offer a source of immediate liquidity should they need to fund their end-of-day payment obligations.

⁶ See Section 4.1 for more on the Canadian securities exchanges.

⁷ For an overview of the development of the industry, see Fine, E and M Zelmer (1992): “The mutual fund market in Canada”, *Bank of Canada Review*, Winter.

⁸ Other types of managed funds such as hedge and pension funds also exist.

⁹ Treasury bills typically have a maximum average term of 180 days.

¹⁰ See Section 3 for more on the LVTS and the ACSS.

An LVTS advance is a secured loan provided by the Bank of Canada to a participant in the LVTS to cover a net amount owed by the institution in its end-of-day LVTS position. The interest rate on the one-business-day loan is set at the upper limit of the Bank of Canada's 50 basis point operating band for the overnight interest rate - the Bank Rate. Positive balances are paid interest at the bottom of the operating band.

ACSS advances (also secured) are provided to the direct clearing members of the CPA to cover net amounts owed by the institution arising from the ACSS. The interest rate charged for these advances is set at 150 basis points above the operating band. Positive balances are paid interest equal to the bottom of the operating band minus 150 basis points.

Collateral services

The Bank of Canada performs several functions respecting the collateral pledged to it in support of overnight advances and participants' use of the LVTS. The Bank establishes the types of assets acceptable for pledging, values the securities that are pledged, and reports the valuations to the LVTS system operator.

Settlement agent services

The Bank of Canada acts as settlement agent, or "banker", for the Debt Clearing Service (DCS), which is operated by The Canadian Depository for Securities Limited (CDS). The DCS clears trades of virtually all debt securities and reports the net payment obligations owed to (and from) the participants resulting from these trades.¹¹ CDS receives payments into its account at the Bank of Canada from participants that owe money to CDS and makes payments to participants entitled to receive money from it. The Bank of Canada incurs no liquidity or credit risk from carrying out this function since the LVTS is used to make end-of-day DCS payments and the Bank will make an LVTS payment on behalf of CDS only if there is a sufficient balance in CDS's own CDS settlement account to cover the amount of the payment.

The Bank of Canada also acts as banker for CLS Bank, providing it with a settlement account and making and receiving payments on its behalf in the LVTS.

1.2.2 Oversight

Under the Payment Clearing and Settlement Act, the Bank of Canada reviews all eligible payment and other clearing and settlement systems for their potential to pose a systemic risk. A system is eligible for review by the Bank if:

- it has three or more participants, one of which is a bank;
- it clears or settles Canadian dollar payment obligations; and
- the payment obligations are ultimately settled through accounts at the Bank of Canada.

If the Governor of the Bank forms the opinion that a system has the potential to pose a systemic risk, the system may be designated as subject to the PCSA, provided that the Minister of Finance is of the opinion that this is in the public interest. Once designated, a system has to satisfy the Bank that it has mechanisms in place to manage and control systemic risk. The Governor may issue directives to the system operators or to participants in a designated system in extreme situations where the Governor judges that systemic risk is being inadequately controlled. The Bank has designated the LVTS, the DCS and the Canadian dollar operations of CLS Bank under the PCSA.

The Bank has issued the Guideline Related to Bank of Canada Oversight Activities under the Payment Clearing and Settlement Act.¹² The Guideline describes how the Bank operates under the PCSA, particularly in gathering information to identify eligible systems and in determining whether eligible systems will be designated. The Guideline also indicates the minimum standards that the Bank applies to designated systems. These minimum standards incorporate the Core Principles for Systemically

¹¹ See Sections 1.3.3 and 4.2.1.

¹² Available on the Bank of Canada's website (www.bank-banque-canada.ca).

Important Payment Systems issued by the Committee on Payment and Settlement Systems (CPSS).¹³ The LVTS, Canada's principal system for large-value payments, has been assessed by the Bank of Canada as being in full compliance with these core principles. In addition, in June 2000, the International Monetary Fund and the World Bank published their Report on the Observance of Standards and Codes in Canada (prepared in the context of the Financial Sector Assessment Program), which concluded that the LVTS is in full compliance with the CPSS Core Principles.¹⁴

The PCSA also provides the Bank of Canada with a number of powers that it could exercise in its dealings with payment and other clearing and settlement systems. Two noteworthy powers are the ability to provide a guarantee of settlement to particular systems, and the ability to pay interest on special deposits accepted from the participants in particular systems. With regard to the former power, the Bank of Canada has provided a guarantee that the LVTS will settle in the extremely unlikely circumstance that more than one participant fails during the LVTS operating day. The guarantee could only be called on in extremely rare circumstances where all of the following conditions held: there is an unanticipated failure of more than one participant on the same day during LVTS operating hours, the failing participants have a net owing position vis-à-vis the system, and the amount owed by the failing participants exceeds the value of collateral that has been pledged to the Bank of Canada.¹⁵

1.3 The role of other private and public bodies

1.3.1 Ministry of Finance

The Minister of Finance has oversight powers respecting the Canadian Payments Association (CPA) and payment systems under the new Canadian Payments Act. These include approval and directive powers regarding by-laws, rules and standards set out by the CPA, or any other payment system designated for such oversight under the CP Act.

As both the Bank of Canada and the Minister of Finance have the ability to designate payment systems, a non-statutory body called the Payments Advisory Committee (PAC) has been formed to coordinate oversight activities and to advise the Minister of Finance and the Governor of the Bank of Canada on relevant issues. The group is co-chaired by senior officers of the Department of Finance and the Bank of Canada.

1.3.2 The Canadian Payments Association (CPA)

The Canadian Payments Association is a not-for-profit organisation created by an Act of Parliament in 1980 under the Canadian Payments Association Act. The Act was modified in 2001 to the Canadian Payments Act (the CP Act).

Mandate and services

The mandate of the Association under the CP Act is threefold and, in fulfilling this mandate, the CPA has the public policy objective to "... promote the efficiency, safety and soundness of its clearing and settlement systems and take into account the interests of users". The mandate of the CPA is to:

- establish and operate national systems for the clearing and settlement of payments and other arrangements for the making or exchange of payments;
- facilitate the interaction of its clearing and settlement systems and related arrangements with other systems or arrangements involved in the exchange, clearing or settlement of payments; and
- facilitate the development of new payment methods and technologies.

¹³ See Goodlet, C (2001): "Core principles for systemically important payments systems and their application in Canada", *Bank of Canada Review*, Spring.

¹⁴ This document is available on the IMF website (www.imf.org).

¹⁵ See Section 3.1 for more on the LVTS.

In carrying out its mandate, the CPA owns and operates the two national payment systems in Canada, the Automated Clearing Settlement System (ACSS) and the Large Value Transfer System (LVTS). The Association, through its board of directors, sets by-laws, rules and standards that govern members' participation in these systems and outlines operational procedures. Through a network of committees representing its members and stakeholders, the Association interacts with other payment systems operating in the Canadian environment and actively investigates emerging payment technologies.

Membership and governance

Membership in the Association includes the Bank of Canada, all banks, and authorised foreign banks. Other deposit-taking institutions such as credit union centrals and trust and loan companies have been eligible for membership since 1980. The new Act in 2001 opened membership to certain types of non-deposit-taking financial institutions namely life insurance companies, securities dealers and money market mutual funds.

The CPA is managed by a 16-person board of directors, the chair of which is a representative of the Bank of Canada. Three further positions on the board are appointed by the Minister of Finance and the rest are elected by members, with half of the seats dedicated to "bank" class members and half dedicated to "non-bank" members. Also contributing to the mandate of the CPA is the Stakeholder Advisory Council (SAC), which provides advice to the board on payment, clearing and settlement issues. The group consists of no more than 20 persons including two board members and is broadly representative of the users of the CPA's services and the service providers.

The CPA operates under the authority of the 2001 Canadian Payments Act. The board of directors administers the proprietary payment systems and fulfils its mandate on behalf of its member institutions. All CPA by-laws are approved by Cabinet.¹⁶ CPA rules and standards, including amendments to such, are subject to a 30-day review period by the Minister of Finance, who has the power to disallow any rule in whole or in part that is not deemed to be in the public's interest. The Minister also has the authority to direct the CPA to make, amend or repeal a by-law, rule, or standard.

1.3.3 The Canadian Depository for Securities (CDS)

Services

The Canadian Depository for Securities Limited (CDS) is the securities settlement system operator in Canada. CDS provides three main services: a depository service and two securities clearing and settlement systems, the Debt Clearing Service (DCS) and the Securities Settlement Service (SSS).

The depository service provides facilities to deposit and withdraw depository-eligible securities, manage related ledger positions, and use these positions for various business functions. Major depository accountabilities are the safe custody and movement of securities, accurate record-keeping, and the collection and distribution of the entitlements associated with the securities.

In both securities clearing and settlement systems, CDS participants can report, confirm and settle securities trades. The SSS handles both domestic and foreign securities, and the DCS currently handles only domestic clearing. See Section 4.2 for more details on these systems.

In 2001, CDS migrated domestic longer-term provincial and private sector securities from the SSS to the DCS and intends to migrate all remaining securities in the SSS to an enhanced DCS by the end of 2003.

Membership and governance

CDS was incorporated in 1970 under federal law as a private company. CDS is owned by major Canadian commercial banks, members of the Investment Dealers Association of Canada (IDA), and The Toronto Stock Exchange Inc. Participant admission to CDS is outlined in CDS's participant agreement and service rules. Participation eligibility may be from one of the following categories: Regulated Financial Institution, Canadian Investment Institution, Foreign Institution, Government Body,

¹⁶ That is, approved by the executive branch of the federal government.

and the Bank of Canada. Members may participate in one or more of the CDS services: equity, debt, and money market instruments.

The CDS board of directors consists of 14 directors: nine shareholder directors, one from CDS management, one from the TSX Venture Exchange, and three independent directors from outside the securities industry.

Regulation

CDS, its clearing systems and its participants are subject to legislation and regulations of different jurisdictions. At the federal level, the Bank of Canada oversees the DCS, which is a designated system under the PCSA. At the provincial level, CDS is regulated by the Ontario Securities Commission under the Ontario Securities Act and the Commission des valeurs mobilières du Québec under the Quebec Securities Act. CDS also works with the Alberta and British Columbia securities commissions as needed. In addition, CDS reports as required to the Canadian Securities Administrators (CSA). Finally, CDS cooperates with federal and provincial financial institution regulators, which oversee CDS participants.

1.3.4 Interac¹⁷

Interac is the principal nationwide provider of shared network services for cash withdrawals at automated banking machines and debit card at the point of sale.

Services

Interac provides two basic services, Interac Direct Payment (IDP) and Shared Cash Dispensing (SCD).¹⁸ The SCD service has been operating nationally since 1986. It enables cardholders to withdraw cash from the ABM of any other member or associated institution using a debit or credit card. The service uses a shared network, the Interac Inter-Member Network, to connect the proprietary networks of the members for the routing of transactions. In a similar way, since its introduction in 1990, the IDP service uses the Interac Inter-Member Network to connect proprietary EFTPOS networks to allow consumers to use their debit card to pay for purchases. For both services, the cardholder validates the payment instruction through the use of a personal identification number (PIN), which is verified by the issuer online and in real time for each transaction.

In support of these two basic services, each Interac Association member carries out one or more of four basic operations. Issuers issue cards for access to Interac services and have traditionally been deposit-taking institutions, in line with the requirements for access to membership in the CPA. However, Interac has committed to updating its rules to extend card-issuing eligibility to life insurance companies, securities dealers and money market mutual funds in order to be consistent with the new CPA member eligibility criteria under the CP Act. Acquirers operate the devices that accept Interac-eligible cards, transmit the transaction data to the relevant party, and provide the consumer with an access point to the Interac service. Such devices include ABMs and point of sale (POS) terminals in stores. Direct connectors that provide access to the Interac network for indirect connectors are called "connection service providers". Finally, settlement agents settle the financial obligations arising through the shared networks through the Automated Clearing Settlement System.

Membership and corporate governance

In 1984 the Interac Association was founded by five financial institutions with the goal of facilitating the exchange of electronic transactions that arise from the use of shared ABM networks. By 1986, membership in the association had grown to 10 members and included the largest banks in Canada. Since 1996 every incorporated entity operating in Canada has been eligible for membership.

There are two basic types of members: direct and indirect connectors. Direct connectors connect to each other through the Inter-Member Network. Indirect connectors access the network through a direct connector. As of February 2002 there were 130 members.

¹⁷ The main written source for this section is Interac (2000): *Interac - a backgrounder* (www.interac.org).

¹⁸ See Section 2.2.3 for more on these services.

The Interac Association is governed by a 14-member board of directors which is appointed annually by members based on transaction volumes and subject to certain constraints: at least two must be appointed by non-financial institution direct connectors, three are appointed by indirect connectors, and no more than nine can be appointed by financial institution direct connectors.

Organisational structure

The role of Interac is to facilitate the development of shared services that support electronic banking and payment services offered by its member institutions. Three separate organisations contribute to this mandate. The Interac Association is an unincorporated association which facilitates members' transactions under a common set of rules and markets the two services provided, namely Interac Direct Payment and Shared Cash Dispensing. The Interac trademarks and the software licensing is managed by a not-for-profit company, Interac Inc. Finally, the interface software that facilitates the exchange of financial transactions among members is owned by Acxsys Corporation, which then provides an exclusive licence for that software to Interac Inc.

2. Payment media used by non-banks

2.1 Cash payments

The Bank of Canada is the sole issuer of Canadian banknotes under the Bank of Canada Act. Denominations currently printed and issued are the CAD 5, 10, 20, 50 and 100 banknotes. The CAD 1,000 banknote, although still in circulation, ceased to be issued on 12 May 2001. The Bank of Canada distributes notes according to the demand of financial institutions through the Bank Note Distribution System. Notes no longer fit for circulation are returned to the Bank of Canada.

The Royal Canadian Mint is a crown corporation and operates under the Royal Canadian Mint Act. It is responsible for issuing Canadian coin. Denominations of coins currently issued are the 1, 5, 10 and 25 cent pieces and the 1 and 2 dollar pieces. Both banknotes issued by the Bank of Canada and coins issued by the Royal Canadian Mint are legal tender.

2.2 Non-cash payments

Canadians have a variety of cashless payment options. These can be generally divided into paper-based or electronic payments depending on how the underlying instruction is processed. Paper-based payments are cleared through the ACSS. Electronic payments are cleared in both the ACSS and LVTS.

2.2.1 Paper-based payments

Paper-based payments are cleared and settled through the ACSS. The framework surrounding their exchange is set out in the CPA's by-laws, rules and standards.¹⁹

Cheques

A cheque is a bill of exchange drawn on a member of the CPA and is payable upon demand of the person/institution to whom the item is directed. The statutory framework for cheques is provided by the Bills of Exchange Act (Section 1.1.1) and they are subject to the by-laws and rules of the CPA.

Cheques have traditionally been the means of choice for making cashless payments. However, with the commencement of the LVTS, the use of cheques for large-value payments has decreased substantially as payments have moved to this well risk-proofed, electronic credit transfer system. In addition, for small retail transactions at the point of sale, the use of cheques has begun to give way to

¹⁹ See Section 1.3.2.

other methods such as debit and credit cards. Nevertheless, cheques continue to be a popular way to make payments. In December 2001, they represented 26% of the volume and 81% of the value cleared through the ACSS.

Other debit-pull payment items

Other paper items such as bank drafts, money orders and traveller's cheques, issued by various institutions, account for a very small portion of total non-cash payment transactions. These items are cleared in the same manner as cheques through the ACSS.

Account holder initiated transfers

This method of payment allows the account holder to initiate one-time credit-push type payments to corporate entities, such as utility and phone companies, through a bank branch teller or an automated banking machine. Although currently only representing a small share of the payments cleared through the ACSS, payment of bills by this method has grown substantially since it was introduced in 1996. As of December 2001, this method accounted for 1.3% of the volume cleared in the ACSS.²⁰

2.2.2 Electronic transfers

Direct debits, direct credits and account holder initiated transfers are cleared and settled through the ACSS and are subject to the applicable CPA by-laws, rules and standards.

Direct debit and direct credit

Direct debits are payments preauthorised by the payer and payable at regular repeating intervals for obligations such as rent or mortgage payments, organised savings programmes, bill payments and tax payments. They may also be sporadic payments subject to certain authorisation and notification requirements. The transfer process is initiated each interval by payment instructions from the payee.

Direct credit transfers are payments transferred on a prearranged basis directly into the payee's account at regular repeating intervals. Each transfer is initiated by payment instructions from the payer to its bank to debit its account and forward the payment to the payee's account at its deposit-taking institution. Credit transfers include such payment items as direct payroll deposit, and regular government transfer payments.

Since 1995, the volume of non-cash payments in Canada using direct debit and credit transfer has been growing. In December 2001 they represented 16% of the volume and 14% of the value in the ACSS.

Account holder initiated transfers

Home banking, including telephone and internet banking, is becoming increasingly popular. Most payment providers have websites allowing customers to carry out various transactions such as credit or balance transfers, account balance verification, and monthly bill payments with participating retailers, as well as to manage their asset portfolio. Similar services are offered via the telephone.

Account holder initiated transfers via internet or telephone home banking encompass both customer-to-corporate and corporate-to-corporate payments and are on an ad hoc, as opposed to repeating, basis. Together, these types of payments accounted for 1.8% of both volume and value in the ACSS in December 2001.

Credit transfers through the LVTS

The LVTS facilitates large-value and time-sensitive credit transfers between direct participants in the system who may act on their own and their clients' behalf. CPA by-laws, rules and standards govern the exchange of these payment instructions. Since the LVTS began operations in 1999, the electronic

²⁰ The process for settling these transactions changed in the spring of 2001. The ACSS calculates the bilateral net positions for each direct clearer vis-à-vis each other direct clearer. The bilateral net obligations are settled by each direct clearer making (and receiving) payment through the LVTS.

transfers through this well risk-proofed system have grown to account for 84% of all payment value exchanged through CPA-operated systems.

2.2.3 Payment cards

Automated Banking Machines (ABMs)

The first cash dispenser was installed in Canada by a large chartered bank in 1969. The first automated banking machine followed in 1972. Today ABMs are almost ubiquitous and offer a range of services from simple cash withdrawal to banking services such as deposits, account balance viewing, bill payments and transfers between accounts owned by the same person within the same institution.²¹ Bill payments and cash withdrawals from ABMs branded by an institution other than the card issuer are cleared and settled through the ACSS. To access the remaining services, cardholders must typically use an ABM branded by the same institution as their card and the transactions are usually processed as “on-us” items within the institution.

Any corporate entity operating in Canada can own, and provide, ABM services. Proprietary networks typically connect to a shared network such as Interac²² so that cardholders can use machines branded by companies other than those of the card issuer. Although the majority of ABMs continue to be owned by deposit-taking institutions, ABM networks owned and operated by non-deposit-taking companies that offer cash-dispensing services are showing strong growth.

With respect to pricing, surcharges may be charged by the ABM owner, the “acquirer”, to the cardholder for the use of the ABM. Although the use of these fees is rising, they tend to be applied on machines in remote locations and those not labelled by a deposit-taking institution.

As of December 2001, there were 35,632 ABMs across Canada.

Debit cards

Generally, debit cards offer two main services to the cardholder. They allow cardholders to pay a vendor through an electronic funds transfer at the point of sale (EFTPOS), and provide access to the ABM networks with which the card issuer is affiliated. With respect to the latter, such networks include the card issuer’s proprietary network, and shared networks such as Interac, Cirrus and PLUS. Interac offers the principal nationwide network for ABM transactions and EFTPOS.²³

Interac (Section 1.3.4) provides two services. The Shared Cash Dispensing (SCD) service allows customers to withdraw cash from ABMs other than those branded by the institution that issued their card. The Interac Direct Payment (IDP) service allows customers to pay for purchases at the point of sale (EFTPOS). Both services are very well accepted and used by Canadians. In 2001, the IDP service was offered by 328,009 merchants and approximately 2.2 billion transactions were processed through the system for a total approximate value of CAD 94.9 billion. The SCD service processed approximately 375 million transactions with a total value of about CAD 33 billion. Obligations between Interac members arising from these services are cleared and settled through the ACSS.²⁴

There are various fees associated with the IDP and SCD services. Association switch fees are the only fees collected by the Interac Association. Interac calculates the costs of operating the system and sets a “per transaction” fee sufficient to cover its costs. Throughout the year, the fee may be adjusted as needed and on average it is less than 1 cent per transaction. This fee is the same for all members regardless of the volume of transactions they perform. There are no access or licence fees.

²¹ These make up a portion of what are often called “me-to-me” payments.

²² Other networks such as the Visa affiliated PLUS network or MasterCard’s Cirrus network also operate in Canada.

²³ Transactions through proprietary networks are typically cleared as “on - us” transactions within the card issuer. See section 3.2 for more on how shared network transactions are cleared and settled.

²⁴ Besides Interac, other schemes do exist in particular locations. For example, MasterCard has recently begun providing an offline debit card in selected parts of Canada.

Interchange fees for the SCD service are paid by the issuer to the acquirer for each completed transaction and are set by the Interac Association. However, interchange fees for the POS service have been set at CAD 0.00 since the service began.

Card issuers set fees charged to cardholders for access to the shared ABM network and the EFTPOS service. These are often bundled with other account service fees. Additional fees are often charged when the cardholder uses the ABM of a member other than its card issuer.

For POS transactions, acquirers set fees charged to merchant clients. These fees are typically based on a number of issues such as volume and the relationship between the merchant and acquirer. Typically, the fee is bundled with other services such as credit card processing and terminal and PIN pad rental.

Credit cards

Credit cards may be issued by deposit-taking institutions, financial non-deposit-taking institutions, and retailers. Cards issued by retailers that are not connected to a network such as Visa, MasterCard or American Express are typically for use within their own stores only and are generally referred to as "retailer" cards.

Credit cards, including charge cards, provide holders with uncollateralised borrowing (almost always subject to a prespecified credit limit) for either a cash advance (eg, through an ABM) or for purchases at a participating merchant. Payments to merchants can be made face-to-face at the point of sale, by mail, or over the telephone and internet. Depending on the merchant, card authorisation may be either online or offline. Cards may also provide other services such as insurance products and loyalty programmes. Cardholders are billed monthly and, depending on the terms of the card, may pay the whole balance or a partial amount. Interest is charged on the unpaid portion. There is typically a minimum monthly payment.

Depending on the card and the services provided by the cardholder's financial institution, outstanding balances can be paid at bank branches through a teller or ABM, at the retailer issuing the card, by cheque, by direct debit, or by an account holder initiated credit. For Visa and MasterCard, obligations arising among issuers and acquirers are settled through the LVTS.

Regarding the Visa and MasterCard networks, the most pervasive arrangements in Canada, as of the end of 2001 there were 19 principal issuers, 44.1 million cards in circulation, and 1.2 million merchant outlets. The average transaction grew from CAD 67.22 in 1990 to CAD 99.16 by the end of 2001.²⁵

Stored value cards

There are no large-scale, fully implemented stored value (also called e-money or electronic purse) arrangements operating in Canada. Only two major e-money schemes have been running pilot projects over the past year: Visa Cash and Mondex. While the Visa Cash pilot continues, Mondex stopped issuing value on 31 May 2001.

Mondex e-money value was issued by the Mondex Originator, which was a joint venture comprised of Mondex member financial institutions that issued Mondex value. Its last pilot project was initiated in Sherbrooke, Quebec on 26 August 1999. The cards, issued by the Royal Bank and le Mouvement des caisses Desjardins, combined the traditional debit card function, via a magnetic stripe, with an e-money application offered on a MULTOS platform. The card could be loaded through automated teller machines, specialised loading machines, Mondex-compatible phones and the internet with value transferable between Mondex cards. The load limit on cards was determined by the individual financial institution but an informal survey indicated a CAD 500 load limit was the norm across institutions. The project wound down in 2001. The Mondex Originator stopped issuing value on 31 May 2001, with customers able to redeem value left on the chip until approximately the end of October 2001. The Originator is due to close operations on 30 June 2002 and Mondex operations will cease in Canada pending the establishment of a broader smartcard infrastructure that will allow for a national rollout of smartcard applications, including Mondex electronic cash.

²⁵ Statistics for Visa and MasterCard in Canada can be seen on the Canadian Bankers Association website (www.cba.ca).

Visa Cash launched a pilot in Barrie, Ontario, in 1997 involving reloadable cards with multiple payment features issued by the Bank of Nova Scotia. The card's chip facilitates a variety of functions: stored e-money value, customer loyalty plans and an automated transit fare collection function for Barrie Transit. The cards also include a traditional debit function via a magnetic stripe.

Stored value on the cards is loaded in one of two ways: through specialised units that transfer value from the user's bank account to the card through a network operated by the Interac Association, and through the internet via the Bank of Nova Scotia computer banking site. Increasingly, payment services offered through loyalty plans and automated fare collection are gaining importance, as opposed to the stored value function.

2.3 Recent developments

The internet has opened up many payment opportunities. As already discussed, bill payments over the internet through the website of a financial service provider are established and growing. There are also initiatives to deliver customers' bills electronically (electronic bill presentment and payment, EBPP). There are two main developments in Canada, neither with extensive reach as of yet, and the bill payment portion continues to be provided through the website of the customer's financial service provider.

To capitalise on the e-commerce opportunities presented by the internet, many different initiatives have been developed to facilitate internet payments. However, most are still in a developmental stage, or are offered on a limited basis only.

Investigations are currently under way, both within individual institutions and through the CPA, to facilitate account aggregation and me-to-me payments over the internet between two different financial institutions. Finally, various options for cross-border payments continue to be an interesting area of study for payment providers and the CPA.

3. Interbank exchange and settlement systems

The Canadian Payments Association (CPA) owns and operates Canada's two national payment systems, the Large Value Transfer System (LVTS) and the Automated Clearing Settlement System (ACSS). The LVTS is the larger of the two by value. These systems are described in the following two sections followed by an outline of the options for clearing cross-border payments.

3.1 The Large Value Transfer System

The Large Value Transfer System (LVTS) started its activities on 4 February 1999.²⁶ It is an electronic credit transfer system that provides real-time processing and intraday finality of payments, and ensures end-of-day settlement. The LVTS is Canada's primary system for clearing and settling large-value Canadian dollar transactions and is designated under the PCSA for Bank of Canada oversight.²⁷

In December 2001, the daily average payment volume was 15,982 and the daily average payment value was CAD 118 billion, which represents 84% of the total value in the Canadian national payment systems.

3.1.1 Operational rules

The Canadian Payments Act gives the CPA the right to establish by-laws, rules and standards regarding the operation and governance of its systems. The LVTS by-law and associated rules and

²⁶ For more information, see Dingle, J (1998): "The LVTS - Canada's large-value transfer system", *Bank of Canada Review*, Autumn, pp 39-55.

²⁷ See Section 1.3.2 for information on the CPA and Section 1.1.1 for information on the PCSA and the CP Act.

standards govern all aspects of the LVTS. These rules are publicly available.²⁸ It is on the basis of these documents that the CPA oversees both the daily operations of the LVTS and compliance with transaction rules. Both the Governor of the Bank of Canada and the Minister of Finance are given, by the CP Act and the PCSA, certain regulatory powers with respect to CPA rules and by-laws.²⁹

3.1.2 Participants

The CPA sets out the requirements for financial institutions to be direct participants in the LVTS. To become a direct participant, a financial institution must first be a member of the CPA. It must also:

- maintain a settlement account at the Bank of Canada;
- have access to SWIFT in Canada; and
- have the technical capability for its LVTS operations.

Beyond these requirements, the LVTS is an open system that does not require financial institutions to maintain a minimum value or volume of transactions to become a direct participant. Foreign bank branches that are members of the CPA are eligible to become direct participants. However, the Governor of the Bank of Canada has the right to prohibit such a participant if he or she is of the opinion that such a participant poses or is likely to pose an unacceptable risk to the Bank of Canada or the LVTS. Financial institutions that are not direct participants must use the services of a direct participant to carry out transactions in the LVTS.

As of December 2001 there were 14 direct participants in the LVTS, consisting of 10 commercial banks, two federations of credit union centrals, one government savings institution and the Bank of Canada.

3.1.3 Types of transactions

The LVTS is an electronic credit transfer system for the unconditional transfer of large-value or time-sensitive Canadian dollar payments. It is used to facilitate a range of transfers such as commercial transactions, payment obligations arising from the Visa and MasterCard networks, payment obligations arising from the Debt Clearing Service (DCS),³⁰ CLS Bank and the Canadian dollar leg of other foreign exchange transactions, as well as for the transfers relating to the auction of federal government funds. Although designed to process large-value transfers, no minimum value threshold is set in the LVTS.

Participants send their payments through one of two streams; tranche 1 or tranche 2. Tranche 1 is a fully collateralised “defaulter pays” mechanism. Tranche 2 uses collateral in a “survivors pay” arrangement. Tranche 2 payments account for the majority of LVTS volume since the cost of collateral supporting these payments is less.³¹

3.1.4 Settlement procedure

The LVTS is a real-time net settlement system that provides intraday finality for recipients. Each payment instruction is subject to real-time risk control tests. If the tests are passed, funds are made available to the recipient on an unconditional and irrevocable basis intraday. Each participant’s position is calculated in real time on a payment by payment basis. Participants can use one of two streams (tranche 1 and tranche 2) to send their payments; both are subject to caps which make up part of the LVTS risk controls. The specific risk control mechanism depends on the tranche used.

Within each tranche, payment instructions are netted and the netted amounts must be within the pre-established caps. Once a payment passes the LVTS risk controls, it is irrevocable. The risk control mechanisms provide intraday finality to the recipients of funds transfers.

²⁸ On the CPA website (www.cdnpay.ca).

²⁹ See Sections 1.1.1, 1.3.1 and 1.2.2.

³⁰ See Section 4.2.1.

³¹ Section 3.1.5 describes the risk control mechanisms in more detail.

At the end of the daily cycle, the participant's tranche 1 and tranche 2 positions are merged and the final multilateral net positions are settled across settlement accounts at the Bank of Canada. These entries are final. After the settlement period, the Bank of Canada lifts its security interest on the amounts pledged as LVTS collateral.

3.1.5 Credit and liquidity risks and their management

The LVTS has risk control mechanisms that enable payments to be final and irrevocable even in the unlikely event of a default by one or more participants. In aggregate, the amount pledged by participants to the Bank of Canada is sufficient to ensure settlement in the event of a failure of the participant with the largest possible multilateral net debit position.

The main risk control mechanisms are:

- Participants determine their own tranche 1 multilateral net debit caps, which must be fully collateralised. Therefore, in the event of one or more participant defaults, since tranche 1 payments are fully collateralised, sufficient liquidity will be available to settle all tranche 1 payments.
- For tranche 2 payments, each participant extends a bilateral net credit line to each other participant, thereby controlling the amount of exposure it is willing to take on with respect to each participant. Further collateral is pledged by each participant to support tranche 2 payments. The amount pledged is a set portion (called the "system-wide percentage") of the largest limit it grants to any counterparty. This is called the maximum additional settlement obligation (max ASO). Participants may adjust the bilateral credit limits they extend throughout the day. However, although such an adjustment may increase the required collateral, the required collateral will not decrease intraday, regardless of the adjustment made.

In the event of a default, the defaulter's tranche 2 collateral is used first. Any remaining shortfall is made up by survivors on a pro-rated basis based on the bilateral credit limit extended to the defaulter. However, the maximum any survivor will be allotted is their maximum settlement obligation, thereby capping their exposure.

- For tranche 2, each participant has a multilateral net debit cap which is the sum of all the bilateral credit limits granted to it multiplied by the system-wide percentage.
- The combination of bilateral and multilateral caps and the pledged collateral ensures that the system can handle the failure of the participant with the largest net debit position.

Finally, the Bank of Canada guarantees settlement.³² However, given the design of the risk controls, this guarantee would only be called upon in the extremely rare circumstance that more than one direct participant defaults within the same LVTS day, and a defaulter has an overall net debit position in tranche 2, and there is not enough collateral to complete settlement.

3.1.6 Operation of the transfer system and transaction processing environment

Between 12.30 am and 1 am (Eastern time) participants set their own net debit cap for tranche 1 and the bilateral credit limits they granted to each of the other direct participants. Based on the bilateral credit lines they granted, the maximum additional settlement obligation (max ASO) is calculated for each participant. Collateral is pledged to the Bank of Canada in an amount sufficient to cover both the tranche 1 net debit cap and the calculated max ASO, that is collateral supporting tranche 2 payments. The total amount of pledged collateral is often greater than the required amount to allow for intracycle adjustments.

From 1 am to 6 pm the participants send transfers on their own behalf and on behalf of their clients. Participants can adjust their tranche 1 net debit cap throughout this period and change the bilateral lines they extend to other direct clearers with collateral increased accordingly. Also during this period

³² This is a residual guarantee, only invoked once the defaulter's and survivor's collateral have been used.

payment obligations arising from the banknote settlement, the daily auction of federal government funds, the Debt Clearing Service, and CLS Bank settle through the LVTS.

The transfer period is followed by a half-hour presettlement period to allow participants to transact with each other for the purpose of reducing their short or long position, thus reducing the amount they may have to borrow from, or have on deposit with, the Bank of Canada overnight. The period from 6.30-7.30 pm is the final settlement period.

3.1.7 Provision of credit facilities

The Bank of Canada provides intraday credit to participants in the sense that collateral is pledged to the Bank of Canada in support of final settlement. Participants that have a net debit position in the LVTS at the end of the day close out their position by taking a fully collateralised overnight advance from the Bank of Canada for which they pay the Bank Rate.

3.1.8 Pricing

Under the Canadian Payments Act, the Canadian Payments Association charges its members dues for their participation, or level of activity, in the system. The development costs as well as the operating costs are entirely covered by the LVTS direct participants. The pricing method used by the CPA can be characterised as “cost recovery”. The proportion of the total costs charged to each participant depends on its share of the total volume sent and received through the LVTS. New direct participants are charged a proportion of the unamortised development costs and operating costs depending on the volume they send and receive through the LVTS.

Although the Bank of Canada has the right to recover costs for the settlement services it provides to CPA members, it does not presently charge fees beyond the interest charges applied to overdraft loans.³³

3.2 The Automated Clearing Settlement System

The Automated Clearing Settlement System (ACSS), introduced in 1984 as the successor to the commercial bank system then in place, is owned and operated by the CPA. This deferred net settlement system clears and settles electronic payments and all paper-based payments in Canada.

3.2.1 Operating rules

Under the CP Act, the CPA sets the ACSS by-law and supporting rules which govern all aspects of the operation of the ACSS. All by-laws must be approved by Cabinet and are published in the Canada Gazette. The rules are written in support of the by-law and the Minister of Finance has the right to disallow any new rule or amendment within 30 days. Both the ACSS by-law and the associated rules are available on the website of the CPA.

3.2.2 Participants

All members of the CPA can participate in the ACSS.³⁴ Direct clearers enter transactions directly into the system and settle for the net value of payment items drawn on or payable by it through their settlement accounts at the Bank of Canada. They can also act as clearing agents for indirect clearers. In order to be eligible to become a direct clearer, an institution must:

- be a member of the CPA;
- be a deposit-taking institution or a securities dealer;
- process payment items the volume of which is at least 0.5% of the total national volume of payment items;

³³ The Bank of Canada pays interest on deposits at a rate below the target overnight rate.

³⁴ See Section 1.1.2 for a complete description of institutions eligible for CPA membership.

- establish and maintain a settlement account at the Bank of Canada; and
- satisfy the operational requirements of the ACSS.

Indirect clearers are members of the CPA that enter into the ACSS through the services provided by a direct clearer. Items drawn on it or payable by it are settled through a settlement account at a direct clearer.

As of December 2001 there were 12 direct clearers in the ACSS, consisting of eight commercial banks, two federations of credit union centrals, one government savings institution, and the Bank of Canada. There were 98 active indirect clearers.

3.2.3 Types of transactions

Canadian dollar-denominated interbank payments not processed by the LVTS are handled through the ACSS. Paper-based items include debit items such as cheques, postal money orders and traveller's cheques as well as credit-push type items such as account holder initiated transfers (Section 2.2.1). Electronic payment items include direct debit and direct credit items, account holder initiated payments, electronic funds transfers initiated at the point of sale (EFTPOS) and cash disbursements through shared ABM networks such as Interac.³⁵

All items must meet specifications and standards set out in the ACSS rules according to the type of payment item. For this purpose, the items are grouped into "streams" that share the same rules and procedures. The board of directors of the CPA has approved a CAD 25 million cap on the value of individual paper cheques that can be cleared through the system. This cap will be implemented in February 2003. There are no value restrictions on other types of payment in the system.

3.2.4 Operation: transaction processing environment and settlement

Payment items exchanged throughout the day are processed overnight and settled the next day for value as of the day before. The specifics of the exchange and clearing of the items vary depending on the item, for example, whether exchanged on paper or via electronic data transmission. Nevertheless, all items follow a similar path.

Clearing is handled through six regional settlement points across the country and the specifics differ according to the type of payment item. Generally, items collected at CPA members previous to and throughout the value day (V) are forwarded to a local data centre operated, or contracted, by a direct clearer. The items are sorted at the data centre, paper items by high-speed computerised reader/sorter equipment, according to the institutions on which they are drawn. Once sorted, the items drawn on other institutions are delivered to the data centres of the appropriate direct clearer in the same regional clearing area. The delivering direct clearer enters the information on the exchanged items, including the volume and value of items with a "stream" identifier, into its ACSS terminal. This information can be checked by the receiving direct clearers' data centre and disputed if necessary. The next day, the payment items are returned to the branches of the institutions on which they are drawn according to the type of payment item. For cheques, most are returned no later than two days after they are deposited.

This exchange of items, entering of information into the ACSS terminals and, potentially, contesting of entries continues on the value day until the final closing time, which is 11 pm ET for all regional settlement points. The ACSS calculates net position across all "streams" for each of the direct clearers. By 8 am the next morning (V+1), the financial institutions have typically finished making adjustments to their clients' accounts; debiting payers' accounts and crediting payees' accounts. At approximately 9.30 am, initial net balances are available to all the direct clearers and bilateral reopenings of the clearing may occur to correct errors if both counterparties agree. By 11 am, the final multilateral positions of the direct clearers are calculated and made known to the Bank of Canada.

Direct clearers' net positions are settled by adjustments to their settlement accounts at the Bank of Canada. This is typically completed by 12.00 ET on V+1. Direct clearers in a net debit position receive a fully collateralised overdraft for an amount equal to their net debit position. Direct clearers in a net

³⁵ See Section 2.2 for a more detailed description of the various payment types.

credit position have the funds credited to their account and value is returned to them through an LVTS payment on V+1. Note that although settlement is completed on V+1, clients receive value as of day V.

3.2.5 Credit and liquidity risks and their management

The ACSS is a survivors pay, uncollateralised, deferred net settlement system. The settlement entries in the direct clearers' accounts at the Bank of Canada are considered to be final. However, the ACSS does not legally support settlement finality, intraday or at the end of the day.

Participants take on credit risk throughout the day as value is credited to client accounts in anticipation of receiving funds through settlement the next day. However, there are circumstances under which this value may not be received. For instance, some types of payments may be reversed when an item presented is drawn on an account with insufficient funds or if the item is subject to a stop payment order. CPA rules govern the process for the reversal of these payment items. Also, value may not be received in the rare event that a direct or indirect clearer defaults on its settlement obligation. In this situation the CPA rules outline the procedure for a partial unwind of items respecting the defaulter and new multilateral net positions are cast. In this event, a loss allocation may also be assessed on surviving direct clearers.

Some degree of liquidity risk is experienced daily through the uncertainty related to the final net settlement obligation due at 12.00 ET. For both credit and liquidity risk, participants cannot use real-time risk management tools to control their exposure. For example, there are no bilateral or multilateral credit limits.

3.2.6 Pricing

The CPA recovers its operating costs through dues charged to its members. Each year, the total assessment is determined based on the costs of operating the system. The amount each member pays is based on its proportional share by volume of the ACSS payment items it sent and received compared to the total volume of items sent and received. At a minimum, each member pays at least 0.0625% of the total assessment. The dues are payable in two instalments.

As with the LVTS, the Bank of Canada does not charge fees for its settlement services beyond the interest charges applied to overdraft loans.³⁶ The interest charge for ACSS-induced overdrafts is above that applied to LVTS-induced overdrafts.

3.2.7 Future developments

Legislative changes

The Canadian Payments Act of 2001 introduced many changes for the CPA and the systems it operates. One of the most important changes was the expansion of membership from deposit-taking institutions to non-deposit-taking financial institutions.³⁷

Migration of large-value payments to the LVTS

Prior to the implementation of the LVTS in February 1999, the ACSS was the only multilateral system for interbank payments in Canada. Since then, the ACSS has increasingly become a retail payment system as a growing proportion of large-value payments are cleared and settled through the LVTS. This trend is expected to continue, supported by the soon-to-be imposed cap of CAD 25 million on cheques.

³⁶ As with the LVTS, the Bank of Canada pays interest on deposits at a rate below the target overnight rate.

³⁷ See Section 1.1.2.

3.3 Cross-border and multicurrency payments, clearing and settlement

CLS Bank, which began commercial operations on 9 September 2002, is the most significant recent initiative in the area of cross-border multicurrency payments. The Canadian dollar is one of seven currencies initially settling through the system and the LVTS is the CLS Bank approved payment system for the Canadian dollar.

Currently only one Canadian bank is participating in CLS Bank as a settlement member although others are expected to become settlement members in the future. Several LVTS participants provide nostro services to CLS Bank members. There are currently two Canadian dollar liquidity providers.

The Bank of Canada has designated the Canadian dollar operations of CLS Bank under the PCSA. The Bank also acts as banker for CLS Bank by providing it with a settlement account and by making and receiving payments on its behalf through the LVTS.³⁸

Outside of CLS Bank, cross-border payments are settled in a variety of ways. Corresponding banking arrangements are important for both electronic and paper-based payments such as cheques. Correspondent arrangements are typically organised as either “in-house” arrangements where the foreign correspondent for the Canadian clearing bank is its branch or banking subsidiary in the foreign country, or as “club” arrangements, where a group of individual institutions in different payment jurisdictions agree to offer one another indirect access to the domestic clearing system in which they participate.

ABM networks offer access to cash for payments, both to foreigners visiting Canada and to Canadians travelling abroad. Customers can obtain local currency through ABMs via the Cirrus or PLUS networks. The cross-border payment obligation of the card-issuing institution to the cash-dispensing institution is cleared and converted into a US dollar obligation through the MasterCard International or Visa system, respectively. The Canadian leg of the obligation is settled through the LVTS. For example, if a Canadian resident uses a foreign ABM to obtain local currency, the card-issuing institution in Canada settles its obligation to the cross-border cash-dispensing institution through an LVTS payment to the MasterCard (or Visa) settlement bank in Canada. This settlement bank then settles through its nostro account with an international settlement bank serving MasterCard (or Visa). The clearing and settlement process for cross-border Visa and MasterCard credit card payments, as well as for MasterCard offline debit card transactions, is essentially the same process.

There are two cross-border electronic batch payment systems currently operating in Canada: the US Federal Reserve’s International Automated Clearing House (IACH) Service and the European Transferts Interbancaires de Paiements Automatisés Network (TIPANET).

Following a pilot project that began in 1999, FedACH established the IACH Service in July 2001 to send cross-border debit and credit ACH payments to Canada. Currently, the service only facilitates payments originating in the United States for delivery in Canada.³⁹ The IACH involves a club arrangement of correspondent banks for bulk direct credit and debit transfers with a “gateway” operator for each national payment system. One Canadian commercial bank provides the gateway into this system from the Canadian side while the Federal Reserve Bank of Minneapolis is the gateway operator for the US side.

ACH payments initiated in the United States for delivery in Canada are originated by a FedACH member bank and delivered through the FRB Minneapolis to the Canadian gateway operator. For payments originated in the United States, settlement of the US leg is through FedACH at the end of day T. If payable in Canadian dollars, the Canadian gateway operator converts the payment from US dollars on T+1 and formats the payment instruction to be cleared and settled through the ACSS by noon of T+2. If payment is payable in US dollars, it is cleared and settled through the US Bulk Exchange, which will be discussed further.

Payments cleared through this system conform, on the US leg, to the Federal Reserve’s Operating Circular 4 and to NACHA’s Rules for Cross-Border Payments and, on the Canadian leg, to the CPA

³⁸ For more details see Miller, P and C A Northcott (2002): “CLS Bank: Managing foreign exchange settlement risk”, *Bank of Canada Review*, Autumn, pp 13-25.

³⁹ Although it also has the capacity to handle payments originating in Canada for delivery to the United States.

rules for the clearing of such payments. Both gateway operators satisfy NACHA's gateway operator requirements as defined in the Cross-Border Payment Operating Rules.

The Transferts Interbancaires de Paiements Automatisés Network (TIPANET), operated by TIPA Group SC, is a club arrangement involving shareholder cooperative banks in various countries, one of which is Canada's Caisse centrale Desjardins. TIPANET facilitates the clearing of cross-border retail payments through the SWIFT FIN messaging system and it complies with the EC Directives on cross-border payments. Payments are converted to local currency by the receiving TIPANET partner bank with each leg cleared and settled by the originators and receivers in their respective national payment systems. Cross-border settlement is via the correspondent banking arrangements between TIPA partners.

Finally, the CPA owns and operates the US Bulk Exchange System (USBES) to facilitate the clearing of US dollar-denominated payments, both cheques and certain types of electronic payments, between members of the CPA. The USBES clears payments, calculating the multilateral net positions for each of the 11 directly participating CPA members. The net positions are settled through CHIPS via either the Canadian participants' branch or subsidiary acting in CHIPS, or via correspondent arrangements.

4. Securities settlement systems

There are currently two main markets for equity securities in Canada, each of which use electronic trading systems. The Toronto Stock Exchange is the largest and primarily handles senior equity issues. The TSX Venture Exchange lists primarily small and emerging companies and has a market capitalisation approximately 1% of that of the Toronto Stock Exchange. Some Canadian securities dealers who are also members of the US National Association of Securities Dealers have direct access to the US Nasdaq market. The Bourse de Montreal is Canada's principal market for derivative securities. The fixed income market is a decentralised market with trading taking place bilaterally between dealers and clients or through screen-based voice brokers. Regulation of the securities industry is conducted through provincial securities commissions, with some aspects delegated to self-regulatory organisations.

The Canadian Depository for Securities (CDS) has two systems for the clearing and settlement of securities transactions. The Debt Clearing Service (DCS), a well risk-proofed system, facilitates the clearing and settlement of all Canadian dollar-denominated debt. Equities and US dollar-denominated debt securities are cleared and settled through the Securities Settlement Service (SSS). Derivatives contracts are cleared and settled through the Canadian Derivatives Clearing Corporation (CDCC).

4.1 Trading

4.1.1 Regulation⁴⁰

The securities industry is regulated in each province by a government body, a securities commission, that oversees a provincial or territorial securities act. The provincial and territorial bodies communicate and coordinate through a forum called the Canadian Securities Administrators (CSA).

Some of the provincial securities commissions delegate some aspects of regulation to self-regulatory organisations (SROs). The stock exchanges (outlined below) each have responsibilities with respect to their particular market and members. The Investment Dealers Association (IDA) is both a trade association and a self-regulatory organisation for the securities industry, exercising member regulation over the business activities of member securities firms. In February 2002, Market Regulation Services Inc. was recognised as a self-regulatory organisation in order to provide market regulation services to alternative trading systems and exchanges.

Investors are safeguarded by the Canadian Investor Protection Fund (CIPF), a private trust fund established to protect customers (up to CAD 1 million) in the event of the insolvency of a member of

⁴⁰ Information taken from the IDA (www.ida.ca) and MFDA (www.mfda.ca) websites.

any of the above-mentioned SROs. Finally, the Mutual Fund Dealers Association (MFDA) is a self-regulatory organisation consisting of mutual fund dealers. It is responsible for regulating the sales and distribution of mutual funds by its members in Canada, except in Quebec where the Bureau des services financiers assumes these responsibilities.

4.1.2 Equity markets

The existence of stock exchanges in Canada can be traced back more than 125 years. The Montreal Stock Exchange (now known as the Bourse de Montreal or “Bourse”) was the first to incorporate in 1874, while the Toronto Stock Exchange was founded in 1878. Other exchanges followed in the early years of the 20th century, but, by 1999, four main stock exchanges were operating in Canada - the Bourse de Montreal, the Toronto Stock Exchange, the Alberta Stock Exchange (ASE) and the Vancouver Stock Exchange (VSE).⁴¹

The Toronto Stock Exchange is Canada’s principal market for equity trading; in 1998 its share of equity trading reached almost 90%. In March 1999, the four main stock exchanges announced an agreement to restructure the Canadian markets into areas of specialisation. The agreement was implemented at the end of 1999 and in early 2000. As a result, the trading of senior equities was consolidated on the Toronto Stock Exchange, derivatives trading was transferred to the Bourse de Montreal, and the ASE and VSE, after merging to become the Canadian Venture Exchange (CDNX), specialised in the trading of junior securities.⁴² The CDNX became a wholly owned subsidiary of the Toronto Stock Exchange in 2001 and was renamed as the TSX Venture Exchange in early 2002.

As SROs, each of Canada’s exchanges (with the exception of Nasdaq Canada - see below) have been delegated responsibility by their securities regulator for the regulation and surveillance of market activity. Participating domestic organisations (ie Canada-based brokers and dealers) and their employees are regulated by the IDA or the Bourse de Montreal. Each exchange is overseen by a board of directors.

Toronto Stock Exchange

A modified electronic auction/order-driven market for “senior” equity, the Toronto Stock Exchange is by far the largest exchange in Canada. The Toronto Stock Exchange’s market structure can be characterised as a modified continuous auction market because of the role played by two groups to support the trading process: registered traders and investment dealers. Investment dealers play a key role in what is called the “upstairs market”, quote-driven block trading between securities dealers and institutional investors. The upstairs market has been estimated to account for 50% or more of the Toronto Stock Exchange’s trading volume. The growth of “upstairs trading” can be attributed to many factors, including the growing importance of institutional investors since the 1970s, concentration among investment dealers and institutional investors, regulatory changes, and technological progress that allows participating organisations to perform upstairs trading with small retail trades. On 5 April 2002, the Toronto Stock Exchange launched POSIT Canada, a non-attributed, electronic order matching system (a periodic call market) aimed at the institutional upstairs market for equity securities.

In terms of market capitalisation of domestic companies, as of December 2001 the Toronto Stock Exchange was the seventh largest equity exchange in the world. In 2001, the Toronto Stock Exchange accounted for 99.5% of the value of trading on Canadian exchanges and the total quoted market value of outstanding shares was approximately CAD 982 billion.⁴³

The Toronto Stock Exchange demutualised its ownership structure in June 1999, and is now a “for-profit” entity owned by its shareholders, although presently those shares are held exclusively by former member firms. The Toronto Stock Exchange is a part of the TSX group of companies, which also includes Canada’s junior equity market (the TSX Venture Exchange), TSX Markets (a wholly

⁴¹ Other smaller exchanges were also present: the Winnipeg Stock Exchange, The Winnipeg Commodity Exchange and the Toronto Futures Exchange. The Canadian Dealing Network (CDN) was recognised as a quotation and trade-reporting system.

⁴² Additional information regarding the exchanges can be found at www.tse.com, www.me.org, www.cdnx.com and www.international.nasdaq.com/Nasdaq-Canada/NasdaqCanada.asp.

⁴³ International Federation of Stock Exchanges (www.fibv.com).

owned subsidiary which provides trading and market data services), and Market Regulation Services Inc. (an independent not-for-profit corporation which was created in equal partnership with the IDA following the demutualisation in order to separate the Toronto Stock Exchange's market regulation function from its other business lines).

TSX Venture Exchange

An electronic modified order-book market very similar to the Toronto Stock Exchange, the Canadian Venture Exchange, then known as the CDNX, officially commenced trading on 29 November 1999. Given its focus on small and emerging companies, at the end of 2001 the equity capitalisation of the 2,688 listed firms was around CAD 10.6 billion, approximately 1% of that of the Toronto Stock Exchange. The CDNX became a wholly owned subsidiary of the Toronto Stock Exchange in 2001, and is now known as the TSX Venture Exchange. Shareholders of both exchanges voted in favour of the merger in May 2001, and regulatory approval was granted in late July.

Bourse de Montreal (Bourse)

Since the restructuring of the Canadian exchanges, the Bourse (also an electronic, continuous auction/order-driven market) has been the market for derivatives products. Futures and options contracts on interest rates (eg the 10-year Government of Canada Bond), indices (ie the S&P/TSX composite and its sub-indices) and on individual stocks are now offered by the Bourse de Montreal.⁴⁴ Since 1999, the Bourse has been a member of the GLOBEX Alliance - an international electronic trading network offering access to several of the world's most actively traded financial futures products. For the year 2001, the volume of trading for the Bourse's main products was close to 12.7 million contracts.

The Bourse de Montreal demutualised its ownership in October 2000 (although, as with the Toronto Stock Exchange, all shares are currently almost exclusively privately held by the former mutual owners) and is an SRO overseen by the Quebec Securities Commission (QSC).⁴⁵

Nasdaq Canada

On 26 April 2000, Nasdaq Stock Market Inc (Nasdaq) and the Government of Quebec announced that they had reached an agreement to establish a new exchange: Nasdaq Canada. Nasdaq US is a dealership, quote-driven equity marketplace which has specialised in the securities of small to mid-sized and new technology firms.

In November 2000, Nasdaq terminals were installed in the offices of those Quebec dealers who are members of the US National Association of Securities Dealers (NASD), allowing them direct access to the US Nasdaq market. Regulation is being carried out by NASD Regulation. Clearing and settlement of securities are handled through an existing bilateral agreement between the US Depository Trust & Clearing Corporation (DTCC) and the Canadian Depository for Securities.⁴⁶ As of autumn 2002, further plans to establish a new exchange have been put on hold.

Alternative Trading Systems (ATSs)

An Alternative Trading System (ATS) is an automated trading system which is introduced in competition with established marketplaces. Following a previous unsuccessful attempt to do so in 1988, Instinet established the first institutional ATS in Canada, installing terminals in Canada in 1995 (and listing only foreign companies). A second company, VERSUS Technologies (acquired by E*TRADE Canada in August 2000), also implemented an institutional ATS that year. Still, ATSs in Canada have not captured significant market share.

In July 1999, the Canadian Securities Administrators (CSA) presented a proposal to accommodate more widespread operation of ATSs in Canada, mandating market linkages, consistent trading rules

⁴⁴ At the end of 2000, 128 small-sized Quebec companies were still listed on the exchange. In the autumn of 2000, the Bourse and the TSX Venture Exchange (then known as the CDNX) reached an agreement for the transfer of these companies, which was completed in October 2001.

⁴⁵ Commission des valeurs mobilières du Québec (CVMQ).

⁴⁶ Note that all Nasdaq-listed securities are traded in US dollars.

across markets, and consolidated market information requirements. The proposal was revised in 2000 and the final version, called Rule ATS, was adopted in Quebec on 28 August 2001 and was approved by the Ontario Minister of Finance on 17 October 2001 (with a concurrent execution date of 1 December 2001). Approval has since been obtained in all the major provincial jurisdictions.

4.1.3 Fixed income markets

Decentralised and largely institutional in nature, Canadian debt markets are primarily regulated through member regulation of the IDA. In particular, IDA Policy No 5 describes the required standard in terms of market conduct for securities dealers. Rule ATS mandates the creation of a market regulator for debt markets, although such a regulator has not yet been formally identified. Fixed income trading settles through CDS's Debt Clearing Service, over which the Bank of Canada has oversight responsibilities. In recent years, Canadian fixed income securities (including provincial and corporate securities) have moved from registered and bearer certificate to a book-based system.

Wholesale customer market

Trading between dealers and their institutional clients traditionally takes place in the quote-driven, bilateral, telephone-based market. Attempts to introduce electronic trading in the wholesale customer market are in the preliminary stages. Some single-dealer proprietary trading platforms have been introduced. There are currently three multilateral trading systems in the wholesale customer fixed income market. CanDeal, an institutional multiple-dealer-to-client trading system, announced that it had been granted regulatory approval by the OSC and the IDA on 5 July 2002, and commenced operation on 10 September 2002. CBID Markets, which was granted regulatory approval in March 2002, and became active in July 2002, operates a multi-participant, anonymous, order-driven market for dealers and customers. Bloomberg Bondtrader (operated by Bloomberg Tradebook Canada) is an electronic bulletin board system on which securities dealers display quotations in government fixed income securities; the system is included as part of the basic Bloomberg subscription and was granted regulatory approval in September 2002.

Inter-dealer market

The inter-dealer fixed income market in Canada is currently dominated by four screen-based brokers or inter-dealer brokers (IDBs).⁴⁷ Freedom International Brokerage (recently acquired by Cantor Fitzgerald) and Shorcan specialise in bond trading, while Prebon and Tullett & Tokyo facilitate trading in money market instruments.

Prior to the introduction of the first IDB to Canada's fixed income market (Shorcan in 1978), securities dealers traded amongst themselves in a bilateral, telephone-based market. This practice has become less and less common in recent years, but full electronic trading in the inter-dealer market has yet to take hold. A system designed to provide transparency in the inter-dealer fixed income market, CanPX, was introduced in the autumn of 2001. This system displays aggregated quotes and post-trade information from the various IDBs.

The IDA influences the inter-dealer broker market through regulation of participants: IDA members are restricted from trading on an IDB that does not meet the requirements put forth in IDA Regulation 2100.

Retail customer market

Distribution to the retail market has traditionally been over the phone, or in person at the branch of a financial institution that deals in these securities. However, e-banking has begun to take hold. Bond Centre is a retail multiple dealer trading environment offered through E*TRADE Canada. Its BondMatch system (developed by CollectiveBid) features access to live dealer quotes.

In February 2002, Toronto-Dominion Bank and BondDesk (USA) announced the formation of BondDesk Canada, an ATS which will also provide real-time quotes and trading to retail investors. Its prospective launch date has not yet been announced.

⁴⁷ Screen-based brokers post bids and offers on a computerised network. Dealers who wish to trade must call the broker.

4.1.4 Foreign exchange markets

The vast majority of trades between dealers and customers take place in a quote-driven, telephone-based market. Multiple-dealer electronic trading platforms such as FXall and FXConnect are a small but growing presence in the Canadian market.

Roughly 80-85% of the activity in the Canadian inter-dealer foreign exchange market takes place on Reuters Dealing (D2000-2 and D3000), a system which allows participating dealers to post quotes and trade anonymously. The remainder of inter-dealer activity takes place through voice brokers (Freedom, Prebon and Tullett & Tokyo) or by direct, telephone-based, dealer-to-dealer trading, although these methods have become much less common over time.

In the past, foreign exchange settlement was a decentralised arrangement with obligations typically cleared and settled through nostro bank arrangements. A new arrangement, CLS Bank, to settle foreign exchange transactions began commercial operations on 9 September 2002. With the support of the world's largest foreign exchange dealing institutions, CLS Bank has the potential to become a central feature of foreign exchange settlement.⁴⁸

4.2 Clearing and settlement

There are two main systems for clearing and settling debt and equity securities, both owned by the Canadian Depository for Securities: the Debt Clearing Service (DCS) and the Securities Settlement Service (SSS). The DCS is the largest by value, facilitates the clearing and settlement of all Canadian dollar-denominated debt securities, and is designated for oversight by the Bank of Canada. The SSS facilitates the clearing and settlement of equity and US dollar-denominated debt securities and, compared to the DCS, is a high-volume low-value system. It is expected this system will be phased out in 2003 with all securities then being settled through an enhanced DCS.

The Canadian Derivatives Clearing Corporation (CDCC) is the issuer, clearing house and guarantor of exchange-traded interest rate and equity derivatives contracts in Canada.

4.2.1 The Debt Clearing Service (DCS)

Institutional aspects

The DCS is owned and operated by the Canadian Depository for Securities and is designated for Bank of Canada oversight under the Payment Clearing and Settlement Act.⁴⁹ It is an online real-time system that was first implemented in 1994 to clear and settle Government of Canada Bonds. Following enhancements to its risk containment arrangements in 1995, Government of Canada Treasury Bills were added to the system. In 1998, the remaining money market instruments followed. In 2001, CDS migrated longer-term provincial and private sector debt securities from the SSS into the DCS. Future-dated transactions involving Government of Canada Bonds or Treasury Bills are handled within the DCS using a process called DetNet. The remaining securities held in the SSS, equity securities and foreign debt, are planned for migration to an enhanced DCS in 2003. The enhanced system will be called CDSX.

Clearing and settlement

The DCS is a model 2 delivery versus payment mechanism: transactions are settled with securities ownership moving on a gross real-time basis while the net funds positions are calculated and settled at the end of the day.⁵⁰

Trade transactions are entered by one party and confirmed by the other party. These transactions can be entered into the DCS either via file transmission or by direct access. DCS netted payment

⁴⁸ See the chapter "International payment arrangements" for more on the CLS Bank initiative.

⁴⁹ See Section 1.1.1.

⁵⁰ Securities may also be cleared via a daily batch settlement which occurs during the early hours. Although described as a batch process, it is legally a gross mechanism.

obligations are settled at the end of the day via designated bankers, with payments made through the Large Value Transfer System (LVTS) to CDS's settlement account held at the Bank of Canada. Special procedures have been developed to allow securities that are held in the DCS to secure the DCS intraday payment obligations to be used as collateral to make the LVTS payments. CDS retains a prior claim on these securities until the LVTS payment is made. LVTS payments are final and irrevocable, allowing final settlement of CDS to occur once all the payment obligations have been received. After settlement, securities that were held in accounts with restricted access become available for use without restriction.

In January 2002, CDS introduced a new functionality within the DCS called DetNet. For users of this function, confirmed future-dated trade transactions involving Government of Canada Bonds or Treasury Bills are netted by security and settlement date, with CDS becoming the counterparty to the netted transactions. Settlement of these netted transactions is completed through the usual DCS settlement arrangement.

The opening hours for the DCS are designed to support the operations of CLS Bank. The DCS is open from 12.30 am-8 pm. Online activities become available at 12.30 am, settlement of payments begins at 4 pm and ends at 5 pm. After settlement, the DCS remains open until 8 pm for movement of securities only.

Risk management

The risk containment model developed in the DCS, which is based on survivors pay, runs in real time and is designed to protect CDS from the intraday failure of the participant with the single largest net obligation to CDS. Moreover, the Bank of Canada acts as CDS's settlement agent so that CDS is protected from "banker risk".⁵¹

There are fundamentally two types of participants in the DCS - receivers of credit and extenders of credit. The receivers of credit are the majority of institutions participating in the system and they receive lines of credit from extenders that enable them to purchase securities. At the end of the day, the extenders of credit are required to make payments to the clearing house to cover securities bought on their own behalf and on behalf of their customers, as well as to cover securities bought by receivers of credit. Receivers of credit grant the extenders a security interest in the securities delivered to the receivers on that day. If an extender is required to make payment for a receiver that is unable to fulfil its end-of-day payment obligation, the extender is entitled to take possession of those securities (the so-called delivered or "unpaid-for" securities). The amount that each extender can owe the system (either on behalf of those to which it has extended credit or on its own behalf) is capped.

The system also has a loss-allocation procedure in the event that an extender of credit is unable to meet its end-of-day payment obligation, either for its own net purchases during the day or on behalf of those receivers of credit that are unable to fulfil their payment obligations at the end of the day. Under the loss-allocation procedure, the remaining extenders are required to fulfil the obligation to the system of the failed extender. This loss-allocation procedure is backed up by a security interest held by CDS and surviving extenders in the securities of the failed extender and of any failed receivers for which it is supposed to make payment, as well as a pool of collateral that all extenders of credit maintain in accordance with the requirements set out in the DCS Rules. The sum of these two types of collateral is sufficient to cover the failure of the extender with the single largest possible net debit to the system. Thus, in the case of the failure of a single extender, the DCS would be able to settle without unwinding any settled transactions and without causing undue liquidity strains for participating financial institutions.

Within this framework, the Debt Clearing Service incorporates a variety of risk control mechanisms in its design and operations.

- The DCS is a real-time online facility with the position of each participant calculated on a transaction by transaction basis.
- The DCS has been designed to operate on a delivery versus payment (value for value) basis. There is gross, or item by item, settlement for securities transfers throughout the day and, at

⁵¹ The risk to participants in a clearing and settlement system of the failure of a private sector institution acting as settlement agent for the system.

the same time, there is continuous netting and novation to CDS of corresponding payment obligations.

- Extenders of credit net debit positions vis-à-vis the DCS are subject to “system operating caps”, ie ceilings, with the cap linked to the size of each extender’s regulatory capital.
- A collateral pool is maintained to secure payment items and to provide coverage of intraday risk, until payment exchange is complete. The Aggregate Collateral Value (ACV) edit ensures that any default will be fully collateralised at all times by securities. The system rejects transactions that would cause a participant’s payment obligation to exceed the value of securities pledged as collateral to cover that payment obligation. The ACV tracks the value of a participant’s collateral in real time.
- Any transactions that would put a participant outside the limits imposed by the collateralisation requirement or system operating caps are placed in a “pending” status until a change allows the transaction to settle within these limits.
- All participants in the DCS can calculate exactly their maximum risk exposure at any given time.
- At the end of the day, the net amounts owed and owing between CDS participants (as a result of the novation of obligations to CDS) are settled using the Large Value Transfer System (LVTS).
- The system does not permit the reversal or unwinding of transactions as a means of dealing with participant failure.
- The Bank of Canada acts as settlement agent for CDS in the LVTS, with respect to payment obligations in the DCS. The Bank of Canada, in carrying out this daily function, receives payments from participants that owe money to CDS and makes payments to participants entitled to receive money from CDS. With the Bank acting as settlement agent, so-called “banker risk” is eliminated for the DCS and its participants. Banker risk refers to the possible failure of a private sector institution acting as a settlement agent for a clearing and settlement system. There is no liquidity or credit risk to the Bank of Canada from carrying out this function because the LVTS is used to make end-of-day DCS payments and the Bank will make an LVTS payment on behalf of CDS only if there is a sufficient balance in CDS’s account to cover the amount of the payment.

The DetNet process has a separate risk management structure that requires each DetNet participant to contribute margin collateral that covers the participant’s own risks to CDS for their DetNet activities. If a participant fails to fulfil any of its obligations to CDS within DetNet, CDS may suspend the participant and initiate both the DCS default procedures and the DetNet closeout procedures. The DetNet closeout procedures use a defaulters pay model, and the value of the DetNet collateral that CDS has received from the defaulting participant is expected to be sufficient to cover any DetNet loss generated by the default of that participant.

4.2.2 The Securities Settlement Service (SSS)

The SSS is owned and operated by CDS. It allows for settlement of equity and foreign pay securities. However, plans are under way to move the settlement of these items to an enhanced (and well risk-proofed) DCS. The enhanced system, to be called CDSX, is expected to be completed during 2003.

Clearing and settlement

Transactions are completed through a batch net process, which occurs in three cycles during the day, with the latter involving US dollar-denominated securities and funds only. Securities are moved on a gross basis, with funds positions being netted. However, the system does not operate in real time. Securities positions are moved at the end of the cycles and cash payments are netted and completed via designated paying agencies. For Canadian dollar-denominated funds, funds settlement is completed through the issuance and receipt of cheques, which are provisional payments that are cleared and settled through the Canadian Payments Association’s Automated Clearing and Settlement System (ACSS). For US dollar-denominated funds, settlement is completed via designated paying agencies with the funds being sent through Fedwire into CDS’s banker’s account at the Federal Reserve Board.

Risk management

The SSS does not operate in real time and does not have risk containment mechanisms that are as robust as those in the DCS. To secure payment of amounts due, each participant grants CDS a security interest in the following collateral: all cheques and money received by CDS on behalf of the participant upon trade settlement; all payments made to the participant through any service upon trade settlement; all dividends, interest, amounts due from maturity, principal repayments and all other entitlements and proceeds arising with respect to the securities which form the collateral; and all contributions made to a participant fund. The participant fund is made up of contributions from the participants and may include a combination of cash, securities or irrevocable letters of credit in favour of CDS. In some extreme circumstances, unwinds may occur.

4.2.3 The Canadian Derivatives Clearing Corporation (CDCC)

CDCC was established in 1976 as the not-for-profit Trans-Canada Options Corporation. Today it is a for-profit corporation solely owned by the Bourse de Montreal. It is the issuer, clearing house and guarantor of exchange-traded interest rate and equity derivatives contracts in Canada. A variety of instruments are issued and cleared by CDCC. Option contracts include stock, bond and index options. Futures contracts include five- and 10-year Government of Canada Bond futures, three-month Canadian bankers' acceptances, and index futures. Futures options contracts include three-month Canadian bankers' acceptance futures and 10-year Government of Canada Bond futures.⁵²

All clearing members of CDCC must be a member of the Bourse de Montreal or be a Schedule I commercial bank as well as meet other specified criteria related to, among other things, the firm's financial condition. Members of CDCC are regulated by one of three organisations: the Bourse de Montreal or the Investment Dealers Association of Canada, both of which are self-regulatory organisations; or OSFI, which oversees federal commercial deposit-taking institutions. CDCC's rules and by-law amendments are reviewed by the Quebec Securities Commission and the Ontario Securities Commission. Also, to support clearing options that are registered for sale to US residents, CDCC files documentation in accordance with Securities and Exchange Commission requirements.

Exchanges send matched trade information to CDCC via dedicated communication lines. The information is checked against CDCC rules. If the trade information conforms to the criteria, it is accepted and the positions of the participants are immediately updated and the exchange is informed of the revised positions. Futures are marked to market, and trades are settled, daily. The system nets out the positions and members make (or receive) a single payment to (from) CDCC before the markets open on the day after trade day (T+1). Payments are settled across accounts CDCC clearing members hold at CDCC's settlement bank. The delivery and settlement of exercised, assigned or tendered contracts is processed through the Canadian Depository for Securities. The corresponding information is sent on a nightly basis.

CDCC has many risk control mechanisms in place. As the guarantor of the system, it ensures settlement will occur even if a participant defaults on a derivatives contract. There are numerous structures in place to deal with default and limit risk including among others membership standards, margin deposits, a securities borrowing facility and a shared default contingency fund.

As at the end of 2001, there were 31 members and 25.5 million contracts (one-sided) were processed.

4.3 The use of securities infrastructure by the central bank

The Bank of Canada is a direct participant in the DCS and completes several business activities through its participation.

4.3.1 Collateral management

The Bank of Canada uses the DCS to receive securities as collateral. This collateral is used to support the intraday operations of the LVTS; standing loan facilities related to the settlement of both the LVTS

⁵² Information in this section from: Canadian Derivatives Clearing Corporation (2001): *Information statement on market protection mechanisms, financial resources and default procedures* (www.cdcc.ca).

and the ACSS; and any advances associated with the withdrawal of currency by participants in the Banknote Distribution System (BNDS).

4.3.2 Monetary policy

The Bank of Canada, as part of its monetary policy, has a target for the overnight rate and is prepared to enter into open market securities operations with purchases and resales, or sales and repurchases, to support the target rate. These securities transactions are all settled in the DCS.

4.3.3 Government debt administration

As part of the debt management services the Bank provides to the federal government, the Bank issues through auction and settles through the DCS all new issues of government treasury bills and marketable bond issues. The Bank of Canada acts on behalf of CDS as custodian for Government of Canada securities. Also, all interest and redemption payments on government securities held in the DCS are settled through the DCS by the Bank of Canada acting on behalf of the government.

4.3.4 Client services

The Bank of Canada offers settlement services on behalf of its correspondent clients, primarily other central banks, for Canadian dollar-denominated securities transactions entered into by these clients. These transactions are settled through the DCS.

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List of abbreviations

BAS	Business Administration System
CBF	Clearstream Banking Frankfurt
CBL	Clearstream Banking Luxembourg
CCB	correspondent central bank
CCBM	correspondent central banking model
CEPS	common electronic purse specifications
CESR	Committee of European Securities Regulators
CLS	continuous linked settlement
EACH	European Association of Central Counterparty Clearing Houses
EBA	Euro Banking Association
ECB	European Central Bank
ECN	electronic communications network
ECOFIN	Council of Economic and Finance ministers
ECS	Euro Clearing System
ECSDA	European Central Securities Depository Association
EEA	European Economic Area
ELMI	electronic money institution
EMI	European Monetary Institute
EMU	Economic and monetary union
EMV	standard for integrated circuit cards established by Europay, MasterCard and Visa
EPC	European Payments Council
EPM	ECB payment mechanism
EPSS	European Payment Systems Services SA
ERP	Euro Retail Payment
ESCB	European System of Central Banks
ESCC	European Securities Clearing Corporation
Eurex	European Exchange (common futures market of the German and Swiss stock exchanges)
EURO 1	EU-wide payment system of the EBA
Eurogiro	European network for postal giro systems
EuroMTS	electronic bond trading platform for European benchmark bonds
Euronext	single stock exchange created by the merger between the Amsterdam, Brussels and Paris stock exchanges
FESE	Federation of European Securities Exchanges
FIN	store and forward messaging service for financial institutions on the SWIFT network
FIN Copy	function of the SWIFT network by which instructions may be copied and optionally authorised by a third party before being released to the beneficiary.
HCB	home central bank

Euro area

IBAN	International Bank Account Number
IOSCO	International Organization of Securities Commissions
IP	internet protocol
IST	Information Society Technologies programme of the European Commission
LCH	London Clearing House
MoU	Memorandum of Understanding
MT100, MT102, MT103	SWIFT message formats for transferring payments
NCB	national central bank
Necigef	the Dutch CSD
PACE	Purse Application for Cross-border use in Euro
PNS	Paris Net Settlement system
SEPA	single euro payment area
SET	secure electronic transaction
SFD	Settlement Finality Directive
Sicovam SA	Société Interprofessionnelle pour la Compensation des Valeurs Mobilières SA (French CSD and clearing authority)
SIPN	Secure Internet Protocol Network
SOS	Single Obligation Structure of the EURO 1 system
STEP 1	Straight-Through Euro Payment system of the EBA
SWIFTNet FIN	store and forward messaging service for financial institutions on the new SWIFTNet platform
TARGET	Trans-European Automated Real-time Gross settlement Express Transfer system
XML	extensible markup language

Introduction

On 1 January 2002, euro banknotes and coins were introduced in the euro area. It was an event of paramount importance in the history of Europe. The production of more than 15 billion banknotes posed a huge challenge, especially considering that it required concerted action across 15 printing works in the euro area and that banknotes had to be produced to the same quality standards all across Europe, using raw materials from different suppliers. In addition, the logistics of the actual changeover process were an enormous project requiring very early preparation and intense discussions at several levels. The cash changeover proceeded extremely well and, in fact, in many ways exceeded expectations. The success can be attributed to the quality of the preparatory work performed by all sectors involved and at all levels, as well as to the enthusiasm with which the citizens of the euro area have embraced their new money.

Payment and securities settlement systems in the European Union were originally created with the aim of meeting domestic requirements. They were rather diverse in nature and not necessarily suited to the needs of a single currency area, where an infrastructure is needed which enables the quick and smooth flow of payments and securities at a low cost in the whole area. Against this background, the financial infrastructure in the European Union has undergone rapid changes both in the run-up to and following the introduction of the euro. The launch of the euro and developments in technology led to an overhaul and reshaping of the infrastructure for effecting payments and for the trading, clearing and settlement of securities. In addition, the advent of the single currency has also accelerated efforts to harmonise and consolidate payment and securities settlement systems.

Some payment and securities settlement systems are common to, or relevant for, all the EU member states which have adopted the euro as their single currency. The aim of this chapter is to describe these systems and to depict the legal and regulatory environment in which they operate. Major emphasis has been placed on the role of the Eurosystem, which comprises the European Central Bank (ECB) and the national central banks (NCBs) of the euro area. Last, but not least, the chapter also endeavours to describe aspects and features of payment and securities settlement systems which are common to all EU member states. The reason for this is that, with regard to the legal and banking environment in which payment and securities settlement systems operate, the EU member states which have not yet adopted the euro share a great deal with those which have done so.

The reshaping of the infrastructure and accelerated efforts to harmonise and consolidate payment and securities settlement systems have been particularly prevalent in large-value payment systems. The creation of the Trans-European Automated Real-time Gross settlement Express Transfer (TARGET) system has established an EU-wide RTGS system which is used for the settlement of central bank operations, cross-border and domestic interbank transfers as well as other large-value euro payments. TARGET is an essential vehicle for the implementation of the monetary policy for the Eurosystem, and has helped to create a single money market within the euro area.

The only privately owned and operated EU-wide payment system is the EURO 1 system of the Euro Banking Association (EBA). EURO 1 processes interbank payments as well as commercial payments.

In addition to TARGET and the EBA's EURO 1, three other large-value net settlement systems¹ are in operation as of November 2002: Pankkien On-line Pikasiirrot ja Sekit-järjestelmä (POPS) in Finland, Servicio de pagos interbancarios (SPI) in Spain and the Paris Net Settlement system (PNS) in France. More detailed information on the French system can be found in the relevant country chapter.

With regard to correspondent banking, it has generally been noted that its former role of being one of the main ways of making cross-border payments has diminished in the euro area since the launch of the euro. There are signs that this development will also continue in future.

The situation with regard to cross-border retail payment systems within the euro area is not yet as developed as is the case for cross-border large-value payment systems. Despite the introduction of the euro, cross-border retail payment services have not yet reached the service levels of domestic retail payment services. Significant differences in quality, efficiency and price between domestic and

¹ Euro Access Frankfurt (EAF), operated by the Deutsche Bundesbank, ceased operations on 5 November 2001 when the new German TARGET component RTGS^{plus} was introduced.

cross-border services are still preventing people from reaping the benefits of the single currency. Correspondent banking relationships and enhanced correspondent banking relationships in the form of networks have experienced a remarkable concentration of business in some major correspondent banks. In addition, large-value payment systems are also used for cross-border retail business. The only retail payment system which covers the whole of the euro area and which is open to all banks is the EBA's STEP 1 arrangement (see Section 3.3.3). In order to foster an improvement in the situation for cross-border retail payments, the Eurosystem published a report entitled *Improving cross-border retail payment services - the Eurosystem's view* in September 1999. This report identified the issues to be tackled and drew up a list of objectives to be fulfilled by the beginning of 2002. A progress report was published in September 2000 describing the achievements which the banking community had made and highlighting areas where further work was necessary. In September 2001, the ECB was asked by the ECOFIN Council to prepare a report outlining an agenda for the implementation of a modern payment systems infrastructure for credit transfers in euros. The report entitled *Towards an integrated infrastructure for credit transfers in euro* was sent to the ECOFIN Council and the Internal Market Council in November 2001. The report highlighted the measures which should accompany the reform of the infrastructures and presented a road map for those measures. A Regulation of the European Parliament and the Council on cross-border payments in euros was adopted in December 2001. The Regulation establishes that the charges for cross-border retail payments in euros should be the same as those for similar domestic payments (see Section 1.1 for details on the Regulation).

In the area of securities, the introduction of the euro has eliminated currency segmentation, which was one of the main reasons for the fragmentation of listing, trading and settlement in the countries of the euro area. The increased homogeneity of the securities markets within the euro area has encouraged investors to regard the euro area securities markets as a single entity. Trading, clearing and settlement institutions are trying to respond to this change in the market by increasing their cross-border operations. Moreover, an integrated euro area-wide money market has emerged and the need in part to collateralise money market transactions has provided an incentive for the cross-border use of securities in the euro area. Another factor pushing in the same direction was the requirement for all collateral eligible for monetary policy operations of the central banks of the euro area to be equally usable by all monetary policy counterparties. As no suitable facilities for the cross-border transfer of securities existed at the beginning of monetary union, the central banks set up the correspondent central banking model (CCBM). In the CCBM, central banks act as correspondents for each other, thus enabling the cross-border transfer of securities used for the Eurosystem's monetary policy operations and the intraday credit operations of the European System of Central Banks (ESCB). In response to the increasing need for cross-border transfers of securities in euros, including for commercial purposes, securities settlement systems (SSSs) within the European Union have established links between themselves for the cross-border transfer of securities.

In response to the demands of the securities markets for effective economies of scale and scope, the securities settlement industry is also in the process of consolidating its cross-border activities. The consolidation process covers trading, clearing and settlement structures.

1. Institutional aspects

1.1 The general institutional background

Most of the provisions of the Treaty establishing the European Community (the Treaty) which relate to monetary union and most of the provisions of the Statute of the European System of Central Banks and of the European Central Bank (the Statute of the ESCB) apply only to EU member states which have adopted the euro and/or their central banks and to the ECB. In order to clarify which central banks are meant in which context, the name "Eurosystem" was coined at the beginning of stage three of EMU. The Eurosystem comprises the ECB and the NCBs of those EU member states which have adopted the euro. The decision-making bodies of the Eurosystem are the Executive Board of the ECB and the Governing Council of the ECB. The NCBs of Denmark, Sweden and the United Kingdom, ie those EU member states which are not yet participating in monetary union and continue to conduct an independent monetary policy, are not part of the Eurosystem. When reference is made to the ECB and the central banks of all EU member states, the more general term "European System of Central

Banks" (ESCB) is used. The third decision-making body of the ECB, the General Council, comes into play when matters relating to the ESCB are involved.

One of the basic tasks of the Eurosystem is to promote the smooth functioning of payment systems. The relevant provisions are enshrined in the Treaty and the Statute of the ESCB. The Statute of the ESCB is annexed to the Treaty as a Protocol and thus forms an integral part of the Treaty.

The following legal provisions in the Treaty and the Statute of the ESCB are of particular importance with regard to payment and settlement systems:

- Article 105 (2) of the Treaty (reiterated in Article 3.1 of the Statute of the ESCB), which defines as a basic task of the Eurosystem the promotion of the smooth operation of payment systems;
- Article 22 of the Statute of the ESCB, which states that the ECB and NCBs may provide facilities, and the ECB may make regulations, to ensure efficient and sound clearing and payment systems within the Community and with other countries. Such ECB regulations are directly applicable in the member states which have adopted the euro.

The Treaty assigns to the ECB the regulatory powers to adopt any legal acts which are necessary to implement the basic tasks assigned to the Eurosystem. A distinction can be made between two different kinds of ECB legislation. First, there are legal acts addressed to third parties (other than the NCBs of the Eurosystem). These legal acts are ECB Regulations, Decisions, Recommendations and Opinions. Second, there are internal legal acts, which take the form of ECB Guidelines, ECB Instructions and internal ECB Decisions.

In addition, the EU Council and the European Parliament are empowered by the Treaty to adopt legal instruments. These legal instruments, which are applicable in all member states, include rules relating to the banking industry and the provision of financial services. Thus they also affect the framework for payment and securities settlement systems. The main legal instruments used by the EU Council and the European Parliament are Directives, which have to be implemented at the national level. They are used to harmonise existing rules at the national level or to establish new legislation where national rules do not exist but are deemed necessary. The EU Council and the European Parliament may also use Regulations, which are directly applicable in the member states. Some of the main Directives and Regulations which have an impact on payment and securities settlement systems are the following:

The Settlement Finality Directive (SFD)

The main objective of Directive 98/26/EC of 19 May 1998 on settlement finality in payment and securities settlement systems is to (i) eliminate the main legal risks to which payment and securities settlement systems are exposed, taking into account the significant systemic risk inherent in such systems - both net and gross; (ii) ensure that the smooth functioning of a system cannot be compromised by the application of a foreign insolvency law in the event of the participation of a foreign entity; and (iii) enhance the legal certainty of collateral (also to the benefit of the credit operations of the ESCB). The provisions of the SFD apply to (a) systems, (b) participants in systems, and (c) collateral security provided in connection with participation in a system or in the framework of the operations of the ESCB.

The Cross-Border Credit Transfers Directive

Directive 97/5/EC of 27 January 1997 on cross-border credit transfers is concerned with enabling individuals and businesses, especially small and medium-sized enterprises, to make credit transfers in euros rapidly, reliably and cheaply from one part of the Community to another. The Directive only applies to cross-border credit transfers up to a value of EUR 50,000. It lays down minimum requirements needed to ensure an adequate level of customer information both before and after the execution of a cross-border credit transfer and it sets forth minimum execution requirements. In this respect, it provides that:

- customers be given, in advance, prices which they can understand clearly for any type of credit transfer;
- a transfer should be credited to the beneficiary's account within a clearly defined time scale (not exceeding six days);

- transfers for which the originator pays all the costs (“OUR” mode) will be the rule, unless otherwise stipulated. An intermediary or receiving bank may not make any further charges, in particular not to the beneficiary; and
- when a transfer goes astray, a “money-back” guarantee up to EUR 12,500 is provided.

The Cross-Border Credit Transfers Directive assists the ECB in its task of promoting efficient cross-border payments in the third stage of EMU.

The E-money Directive

Directive 2000/46/EC of 18 September 2000 on the taking up, pursuit of and prudential supervision of the business of electronic money institutions is aimed at fostering the single market in financial services by introducing a minimum set of harmonised prudential rules for electronic money issuance and by applying the arrangements for the mutual recognition of home supervision provided for in Directive 2000/12/EC² to electronic money institutions (ELMIs). This includes the safeguarding of the financial integrity and the operations of ELMIs by, on the one hand, ensuring the stability and soundness of ELMIs and, on the other hand, ensuring that the failure of any one individual ELMI does not result in a loss of confidence in this new means of payment. The E-money Directive further creates a level playing field for the issuance of electronic money by both traditional credit institutions and ELMIs, thus ensuring that all issuers of electronic money are subject to an appropriate form of prudential supervision. The amendment introduced by Directive 2000/28/EC of 18 September 2000 to the definition of credit institution in Article 1, paragraph 1, first subparagraph of Directive 2000/12/EC of 20 March 2000 relating to the taking up and pursuit of the business of credit institutions obliges institutions that do not intend to enter into the full range of banking operations to issue electronic money in accordance with the fundamental rules governing all credit institutions. This amendment promotes the harmonious development of the issuance of electronic money throughout the Community and avoids any distortion of competition between electronic money issuers, including with regard to the application of monetary policy measures.

The Investment Services Directive

Directive 93/22/EEC of 10 May 1993 on investment services in the securities field is also important in the context of payment and securities settlement systems as it abolishes (see Article 15) (i) restrictions on access to regulated markets in EU member states, and (ii) restrictions on access to, and membership of, bodies performing clearing and settlement functions for regulated markets. The abolition of these restrictions on access benefits both investment firms and credit institutions (see Article 2.1).

The Regulation on cross-border payments in euros

Regulation 2560/2001/EC of 19 December 2001 on cross-border payments in euros is aimed at bringing the prices of cross-border payments into line with the prices of similar domestic payments within a country (the so-called principle of non-discrimination). Among the provisions of the Regulation is the requirement that providers of payment services establish charges for the domestic and cross-border use of ATMs and card payments at the same level at the latest from 1 July 2002, and charges for domestic and cross-border credit transfers at the same level from 1 July 2003 for transfers up to EUR 12,500 and from 1 January 2006 for transfers up to EUR 50,000. Furthermore, enhanced price transparency requirements were imposed on the providers of payment services, obliging institutions to provide their customers with prior information on charges. In order to facilitate straight through processing, the Regulation imposes an obligation on institutions to communicate the relevant International Bank Account Number (IBAN) and the Bank Identifier Code (BIC) to their customers upon request. The Regulation also establishes a reporting threshold for balance of payments statistics of EUR 12,500 from 1 July 2002, and increases it to EUR 50,000 from 1 January 2006. The EU member

² Directive 2000/12/EC of the European Parliament and of the Council of 20 March 2000 relating to the taking up and pursuit of the business of credit institutions (includes the former First Banking Coordination Directive and the Second Banking Coordination Directive, which were essential in achieving the single market for banking services in the European Union).

states not participating in EMU were given the possibility to also apply the Regulation to their currencies.

1.2 The role of the Eurosystem

The smooth functioning of payment systems is of particular concern to central banks for three main reasons: (i) a major malfunction in a payment system could undermine the stability of financial institutions and markets; (ii) the soundness and efficiency of payment systems and the security of payment instruments affect the confidence of users and, ultimately, public confidence in the currency; (iii) payment systems represent essential vehicles for the implementation of monetary policy. The payment system policies of central banks are aimed at ensuring the efficiency and soundness of payment systems. In order to achieve these policy objectives the payment and settlement services offered by the private sector are overseen by central banks (for further details on the oversight of payment systems see Section 1.2.1). Central banks also offer settlement services themselves and sometimes assume an operational role in payment systems. For the Eurosystem, this dual role of regulator (“overseer”) and service provider is emphasised, in particular, in Article 22 of the Statute of the ESCB. In addition, the Eurosystem acts as a catalyst for change in the field of payment systems.

Central banks’ payment systems function and prudential banking supervision share the objective of financial stability, ie they are both aimed at reducing the risk of financial crisis. However, while prudential supervision looks at institutions, central banks focus on the oversight of systems. The Eurosystem considers close cooperation between payment system overseers and banking supervisors essential. Therefore, EU payment systems overseers and banking supervisors have agreed on a Memorandum of Understanding (MoU). The MoU is aimed at promoting cooperation between payment systems overseers and banking supervisors in relation to large-value interbank funds transfer systems (IFTSS).

With regard to securities clearing and settlement systems, the Treaty contains no explicit reference to the role of the Eurosystem. Nevertheless, the interest of the Eurosystem goes beyond the limited perspective of a user of collateral in the context of its monetary policy and intraday credit operations. With its general responsibility for financial stability, the Eurosystem, like any central bank in the developed world, has a general interest in the smooth functioning of securities clearing and settlement systems with a view to ensuring the smooth implementation of monetary policy and the smooth functioning of payment systems.

In pursuing the above-mentioned objectives, the Eurosystem also cooperates with other bodies and institutions which are active in the field of payment and securities settlement systems (see Section 1.2.4).

1.2.1 Payment systems oversight

As part of their payment systems function, central banks monitor developments in the field of payment and settlement systems in order to assess the nature and scale of the risks inherent in these and to ensure the transparency of the arrangements concerning payment instruments and services. Where necessary they define principles and standards for the promotion of safe, sound and efficient payment and settlement systems. They ensure that the systems, whether these are operated by the central banks themselves or by private operators, comply with these principles and standards.

The oversight role of the Eurosystem - which is recognised in the Treaty (Article 105 (2)) and the Statute of the ESCB (Articles 3 and 22) - covers both large-value interbank funds transfer systems and retail payment systems. With regard to the systems managed by the Eurosystem, standards are applied which are at least equivalent to those applied to privately operated payment systems.

The Eurosystem has clarified its payment systems oversight policy in a statement entitled *Role of the Eurosystem in payment systems oversight*, published in June 2000. Accordingly, within the Eurosystem, oversight activities are performed in the following manner:

In line with the provisions of the Treaty and the Statute of the ESCB, the Governing Council of the ECB formulates the common policy stance by determining the objectives and setting the standards for payment systems whose functioning may affect the implementation of monetary policy, systemic stability, the establishment of a level playing field between market participants and cross-border payments within the European Union and with other countries.

In areas not specifically covered by the common oversight policy, policies defined at the NCB level apply within the framework of the general common policy stance defined at the Eurosystem level, in relation to which the Governing Council can always take initiatives where necessary. An appropriate level of coordination between the ECB and the NCBs of the Eurosystem is ensured for any proposed policy or action in the field of oversight which an individual NCB may wish to pursue at the national level.

The Eurosystem may also formulate a policy concerning the security of payment instruments in order to maintain user confidence. An example of the latter is the *Report on electronic money*, published in August 1998.

In line with the principle of decentralisation, implementation of the common oversight policy stance is ensured by the NCBs in relation to domestic payment systems. For systems which have no clear national base, the body entrusted with the oversight responsibility is the NCB of the country in which the system is legally incorporated, unless the Governing Council of the ECB decides otherwise on the basis of features of the system and entrusts oversight responsibility to the ECB. This is the case for the Euro System of the EBA Clearing Company (EURO 1) and for the Continuous Linked Settlement Bank (CLS Bank).³ In view of increasing cross-border participation in payment systems within the euro area, the Eurosystem favours a cooperative approach towards the implementation of the oversight policy stance, with the local NCB acting as lead overseer, and being responsible for liaising with other relevant NCBs whenever this is required.

The common oversight policy stance can also be legally ensured by ECB legislation in accordance with Article 22 of the Statute. So far, however, only more traditional, informal tools (eg moral suasion) are used. Where applicable, implementation can also be enforced by legal instruments available to an NCB.

The ECB and the NCBs of the Eurosystem ensure consistency in the implementation of the oversight policy stance and, in particular, that standards are applied in the same way for all the payment systems concerned. To this end, these oversight activities are coordinated at the level of the Eurosystem, through appropriate committees and working groups.

As outlined above, the ECB or the NCB concerned will ensure the management of emergency situations in their capacity as overseers of the different systems. Appropriate information and coordination channels have been established within the Eurosystem to ensure timely communication between the overseers.

In carrying out its oversight role the Eurosystem applies general principles, standards, requirements and objectives which are largely defined in the following reports:

In 1993 the Committee of Governors of the Central Banks of the Member States of the European Community endorsed the report entitled *Minimum common features for domestic payment systems*, which contained the guiding principles for the preparation of payment systems for monetary union. The report underlined the importance of RTGS systems through which as many large-value payments as possible should be channelled in order to maximise the containment of systemic risk. Other large-value systems may continue to operate in parallel with RTGS systems if they fully comply with the minimum standards set out in the *Report of the Committee on Interbank Netting Schemes of the central banks of the Group of Ten countries*, published by the Bank for International Settlements (BIS) in November 1990 ("Lamfalussy report"), and if they settle on the same day at a central bank. The 1993 report also elaborated on access criteria, specifying the requirements set out in the Lamfalussy report in this respect within the context of EU legislation. The common oversight policy of the Eurosystem for large-value IFTSs is based, in particular, on these principles. Moreover, in order to provide further guidance for the implementation of Lamfalussy standard 1, which requires all systems to have a well founded legal basis under all relevant jurisdictions, the Eurosystem has developed

³ It should be noted in this respect that the ECB is the primary overseer for EURO 1, while the ECB is involved in the oversight of CLS as the overseer in respect of the settlement of the euro, in the framework of cooperative oversight set out in the Lamfalussy report. NCBs of participating countries are associated with the oversight activity of the ECB as members of the Eurosystem - the central bank of issue of the euro - and as NCBs of the banks which act as settlement members of CLS Bank.

harmonised “terms of reference” for legal opinions (ie a list of issues which have to be addressed in the legal opinion) for foreign participants in large-value payment systems.

The guiding principles of the Eurosystem’s oversight policy in the field of electronic money are the requirements set out in the ECB’s *Report on electronic money* (1998).

In January 2001, the Governing Council of the ECB also adopted the G10 report on *Core Principles for Systemically Important Payment Systems* as one of the standards the Eurosystem must apply when performing its oversight role.

The cooperation between payment systems overseers and banking supervisors contributes to an overall strategy of risk reduction in the financial system. Cooperation between these authorities is necessary since the stability of the financial system may be affected by the risks borne by credit institutions arising from their participation in payment systems or by their provision of settlement services. In early 2001 the ECB, the NCBs of the Eurosystem and the NCBs of EU member states which have not adopted the single currency, in their capacity as overseers of payment systems, and the EU banking supervisory authorities agreed to an MoU to set out a framework for their cooperation. According to the MoU, overseers will endeavour to ensure that supervisors are made aware of the risks credit institutions run through their participation in payment systems or by being the operator/settlement agent of a payment system. In turn, supervisors will endeavour to ensure that overseers are made aware of the risks posed to the system they are overseeing by the participation of a credit institution and, where the case arises, from the fact that the operator/settlement agent of a payment system is engaged in other banking activities, insofar as these may have implications for its settlement activities. Both authorities will endeavour to ensure that either is able to take prompt remedial action in the event of problems in a payment system which stem from, or have an impact on, a participating credit institution.

As a rule, the oversight of retail payment systems will continue to be defined by the relevant NCBs. However, where new developments occur or where retail schemes would have potential cross-border implications, general policy lines are defined at the Eurosystem level. In this context, in September 1999 the Eurosystem concluded that the situation for cross-border retail payments was unsatisfactory (see the report entitled *Improving cross-border retail payment services - the Eurosystem’s view*), in particular by comparison with domestic payments with regard to prices and execution times. Prices for cross-border transactions, particularly for cross-border credit transfers, are substantially higher than for domestic ones despite the introduction of the euro, and the execution time needed for cross-border transactions is substantially longer than for domestic ones. The low volumes by comparison with domestic business, the still predominant use of correspondent banking arrangements involving many intermediaries instead of using a single payment infrastructure as is the case domestically, and the lack of standardisation and automation at the interbank and intrabank levels were identified as some of the main reasons for these deficiencies. The Eurosystem set out seven objectives (such as a major price reduction for cross-border credit transfers) and decided to act as a “catalyst for change”. The progress report, published in September 2000, acknowledges that the banking community in the European Union has made progress but observes that the objectives defined in the 1999 report have clearly not yet been achieved. At the request of the ECOFIN Council, the ECB prepared a report in September 2001, outlining an agenda for the implementation of a modern payment systems infrastructure for credit transfers in euros. The report entitled *Towards an integrated infrastructure for credit transfers in euro* was published in November 2001. The report recalled the fact that, despite efforts on the part of the European institutions, the banking sector had failed to address effectively the issue of cross-border retail payments in euros and the situation remained highly unsatisfactory. The report summarised the efforts already made to improve some features of cross-border retail payments in euros, as well as the Eurosystem’s view on the possible future development of the retail payment infrastructure. Furthermore, it highlighted the measures which should accompany the reform of the infrastructures and presented a road map for achieving that reform.

The Eurosystem will closely monitor the banks’ further progress and will continue to assist them in achieving the common goal by playing the role of a “catalyst for change”.

1.2.2 Activities in the area of securities clearing and settlement systems

According to the Treaty, the Eurosystem’s monetary policy and intraday credit operations should be collateralised. The Eurosystem therefore has a keen interest in ensuring that the transfer, settlement and custody of collateral are safe and efficient. In order to ensure a level playing field within the euro

area, the Eurosystem has developed and endorsed nine standards to be met by EU SSSs used for ESCB credit operations.⁴ Individual SSSs have been assessed against these standards in order to qualify for use by the Eurosystem. The first assessment was completed before the start of phase three and 29 SSSs qualified. The assessment is carried out on a regular basis in order to monitor major changes in individual SSSs. The Eurosystem also regularly assesses the links established by SSSs for the cross-border transfer of securities.

1.2.3 Operational role of the Eurosystem

One way for central banks to promote the safe and efficient functioning of payment systems is to operate their own payment systems. The main operational role of the Eurosystem lies in the provision of the TARGET system. However, TARGET is not run by the central banks of the Eurosystem alone. All central banks of the ESCB are connected to TARGET. TARGET is the real-time gross settlement system for the euro. It provides facilities for settlement in central bank money. A more detailed description of TARGET can be found in Section 3.1.

The ECB and NCBs also offer their settlement services to other payment and settlement systems - eg the balances of large-value net settlement systems are settled at the central bank. Some NCBs also run retail payment systems and operate in-house SSSs.

The ESCB is also operationally involved in the cross-border transfer of securities which can be used as collateral to obtain intraday credit from NCBs and for monetary policy operations. For this purpose, the correspondent central banking model (CCBM) was established in order to facilitate the cross-border use of collateral in the Eurosystem's monetary policy operations and the intraday credit operations of the ESCB. Within the CCBM the NCBs act as correspondents for each other and thereby enable counterparties to use all their eligible assets to obtain credit from their NCBs. Counterparties to the monetary policy operations of the Eurosystem and participants in TARGET in the EU area can only obtain credit from the central bank of the country in which they are established - their home central bank. However, through the CCBM, they can use collateral held in other countries. A more detailed description of the CCBM can be found in Section 4.3.

1.2.4 Cooperation with other institutions

In addition to defining principles, etc on its own, the Eurosystem also actively cooperates with other bodies and institutions which are active in the area of payment and settlement systems.

First, there is the cooperation with the EU Commission, which regularly participates in meetings with the central banks on issues related to payment and securities settlement. In turn, the central banks participate in meetings at the EU Commission, thus ensuring that cooperation is as close as possible (see also Section 1.3.1 below).

The ECB and several NCBs of the ESCB participate in the Committee on Payment and Settlement Systems (CPSS) of the G10 central banks. The CPSS operates under the auspices of the BIS in Basel. It monitors and analyses developments in payment and securities settlement systems. Its activities are generally more analytical than policy-oriented in nature. Nevertheless, its reports on many different issues have often had a strong influence on practical developments worldwide (for further information visit the BIS website at www.bis.org).

The ECB and several NCBs are participating in a joint task force of the CPSS and the International Organization of Securities Commissions (IOSCO) in the field of SSSs. The task force has already published the *Recommendations for securities settlement systems* containing recommendations for the design, operation and oversight of SSSs. The purpose of these recommendations is to reduce systemic risk, increase efficiency and provide adequate safeguards for investors.

The Governing Council of the ECB and the Committee of European Securities Regulators (CESR) have agreed to conduct joint work on issues of common interest in the field of securities clearing and settlement systems. This work aims at establishing standards and/or recommendations for SSSs and for central counterparties at the European level. The first objective of this joint work is to define

⁴ *Standards for the use of EU securities settlement systems*, January 1998.

common standards for clearing and settlement activities aimed at ensuring a safe and efficient securities market infrastructure in Europe and at creating a level playing field for the providers of securities clearing and settlement services.

The Eurosystem also cooperates closely with banking supervisors. Such cooperation and coordination contribute to achieving the overall objective of reducing risk in the financial system and help to promote stability.

Furthermore, the Eurosystem actively promotes the further harmonisation of codes and operational standards which would enable the straight through processing (STP) of payments. This is crucial for achieving greater security and efficiency in payment and settlement systems.

Last, but not least, the Eurosystem regularly meets with market participants in order to maintain close contact with the market, to convey its ideas to the market and to obtain feedback from market participants on how the work of the Eurosystem in the area of payment and securities settlement systems is perceived.

1.3 The role of other private and public sector bodies

1.3.1 *The Commission of the European Communities, the Council of the European Union and the European Parliament*

The promotion of the smooth operation of payment systems is mentioned in the Treaty as one of the basic tasks of the Eurosystem. Nevertheless, the Commission of the European Communities (the Commission), in its function as the executive body of the European Union, and the Council of the European Union (EU Council) and the European Parliament in their function as the legislative bodies of the European Union continue to concern themselves with issues related to payment and securities settlement systems.

One of the tasks of the Commission is to strive for further harmonisation of the laws within the Union, including those which have an impact on payment systems, by issuing Directives which have to be implemented in national law by the member states. One of the principal aims is to create a single market with a level playing field and equal opportunities throughout the European Union. Consumer protection is another area in which the Commission is active. A recent example can be found in the field of cross-border retail payment systems, where the Cross-Border Credit Transfers Directive of the EU Council and the European Parliament (see Section 1.1) complements the initiatives of the Eurosystem and is pushing the industry to improve the situation quickly. The most recent piece of legislation is the Regulation on cross-border payments in euros. The Commission has also launched an initiative to explore how fraud and counterfeiting in payment systems can be prevented. Another area in which the Commission has recently been active is the cross-border use of collateral. The Directive on financial collateral arrangements (2002/47/EC) outlining a harmonised framework for the use of collateral was adopted by the European Parliament and the Council in June 2002.

1.3.2 *Banking federations and associations*

Most banks in the European Union are organised into national federations or associations in order to represent their interests as a group towards public and private institutions. The national federations and associations also cooperate at the European level in the European Association of Co-operative Banks, the European Savings Banks Group and the European Banking Federation. These European organisations act as platforms for exchanges of views, for reaching agreement on common business policies and for other matters which require a common understanding at the European level. Such activities take place both within the organisations and between the organisations and their bodies. In some countries the banking federations and associations play an important role in negotiating with third parties and agreeing on matters (including payment systems issues) on behalf of their members.

1.3.3 *Other federations and associations*

There are other relevant federations and organisations in the field of securities clearing and settlement systems which act as platforms to promote the interests of their members, to facilitate exchanges of views and to develop common standards and practices. The most significant organisations are the European Central Securities Depositories Association (ECSDA), the European Association of Central

Counterparty Clearing Houses (EACH), the Federation of European Securities Exchanges (FESE) and the Committee of European Securities Regulators (CESR).

2. Payment media used by non-banks (aggregated euro area description)

2.1 Cash payments

The euro was introduced as a currency in its own right on 1 January 1999, although euro banknotes and coins were only brought into circulation on 1 January 2002. From 1 January until the end of February 2002 (the dual circulation period), the legacy currencies of the euro area countries, which were national subdivisions of the euro, continued to be legal tender and could be used for cash transactions in the euro area. In 2000, the total value of banknotes and coins in circulation outside credit institutions in the euro area amounted to EUR 347.7 billion, slightly less than the EUR 349.8 billion in 1999. The growth rate of cash in circulation varied widely across the euro area, with the highest, double digit increases usually found in the fastest growing economies.

Owing to their anonymous nature, there is no precise data on the value and number of cash payments conducted in the euro area. Taking as an indicator the amount of cash in circulation as a percentage of GDP in 2000, cash payments seemed to be in least demand in Luxembourg (1.9%), Finland (2.2%) and France (3.2%). The highest ratios were found in Spain (8.9%), Germany (6.2%), Italy (6.0%) and Austria (5.9%), indicating a higher use of cash for payments. However, any comparison is made difficult by the fact that for some of the legacy currencies there was a substantial though not precisely measurable amount of cash in circulation outside the country of origin.

2.2 Non-cash payments

Credit transfers are the most widely used means of non-cash payment in the euro area, followed by direct debits, as these means of payment offer the most convenience to their users. Also on the rise are card-based payments, with debit cards being preferred to credit cards in most countries.

Although traditionally a very important payment instrument, in many countries of the euro area cheques have been replaced to a large extent by other payment instruments. Even in countries where the actual number of cheque payments is still rising (Ireland, Italy), their importance relative to other payment instruments is declining. A further reduction in the use of cheques can be expected owing to the discontinuation of the eurocheque guarantee at the beginning of 2002.

2.2.1 Credit transfers

Credit transfers are the most widely used means of non-cash payment in the euro area. In 2000 they accounted for more than one third of all non-cash transactions.

Credit transfers are the preferred non-cash payment instrument in six euro area countries. In Finland they made up 57% of all non-cash transactions in 2000, in Austria 56%, in Germany 49%, in Belgium 47% and in Italy and the Netherlands 40%.

2.2.2 Direct debits

The importance of direct debits in the euro area has grown in recent years because of an increased tendency for utility and retail companies to offer this service. In 2000 direct debits accounted for over one quarter of non-cash transactions in the euro area.

The use of direct debits ranged from 4.5% of total non-cash transactions in Finland to 53% in Spain. Direct debits were the second most frequently used non-cash payment instrument in Germany (38%), Austria (30%) and Ireland (23%) and accounted for 29% of total non-cash transactions in the Netherlands. In the other euro area countries direct debits played a significantly smaller role, with their share in total non-cash transactions in 2000 ranging between 6% and 17%.

2.2.3 Payment cards

Though still outweighed in many euro area countries by credit transfers or direct debits, the use of credit and debit cards has increased throughout the euro area as a result of a growing acceptance of card-based payments by retailers. In 2000 more than one fifth of all non-cash transactions in the euro area were completed using some form of payment card.

Debit cards are more widely held than credit cards in most countries of the euro area, outweighing the latter on average 3:1 in terms of the number of cards in circulation in 2000. Although there are more terminals which accept credit cards than debit cards in the euro area (15,356 per 1,000,000 inhabitants as compared with 11,267), debit cards are used on average four times as often as credit cards.

Payment cards dominated non-cash payments in Luxembourg and Portugal, where in 2000 some 60% and 51% of transactions respectively were completed using credit or debit cards. They were the second most important payment instrument in Finland (39%), Belgium (33%), the Netherlands (30%), France (28%) and Spain (23%). At the other end of the scale, a mere 10% of total non-cash transactions in Germany and 12% in Austria were conducted using credit or debit cards.

2.2.3.1 Credit cards

The number of credit cards in circulation in the euro area reached 295 per 1,000 inhabitants in 2000. They were used for an average of 5.8 transactions per person per year.

In 2000, the most cards per 1,000 inhabitants were found in Luxembourg (706), which at the same time had the most credit card transactions per person per year (31.7). Also well above the euro area average in usage were Finland (22.2 transactions per person per year and 588 cards per 1,000 inhabitants), Portugal (19.8 and 303) and Ireland (12.7 and 357). Although in Spain there were 402 credit cards per 1,000 inhabitants in circulation, they were used rarely - just 5.6 transactions per person per year. There was also less demand for credit cards in the other euro area countries, with cards in circulation ranging between 200 and 300 per 1,000 inhabitants and usage below the euro area average.

2.2.3.2 Debit cards

Debit cards are the most widely held kind of payment card in the euro area. There were 874 debit cards per 1,000 inhabitants in circulation in the euro area in 2000, which were used for an average of 23.7 transactions per person per year.

The leading country in the circulation of debit cards in 2000 was the Netherlands with 1,313 cards per 1,000 inhabitants and 50.3 transactions per person per year. Debit cards were also frequently used in Finland (49.3 transactions per person per year and 493 cards per 1,000 inhabitants), France (54.5 and 611), Portugal (45.3 and 1,175), Belgium (39.8 and 1,216) and Luxembourg (26.2 and 710). Despite a large number of debit cards in circulation, Germany (1,207 cards per 1,000 inhabitants) and Spain (1,147) recorded less than 13 transactions per person per year, which was the same range of usage observed in Austria (with 746 cards per 1,000 inhabitants in circulation), Italy (350) and Ireland (211).

2.2.4 Cheques

In 2000, 72% of all cheques in the euro area, or 4.5 billion, were used in France, while in the rest of the euro area approximately 1.7 billion cheques were used. Following the trend of recent years, the use of cheques declined by 2.7% in 2000 compared with 1999 and they are now used for one sixth of non-cash transactions in the euro area.

In France and Ireland cheques are still the most widely used payment instrument, accounting for 38% and 33% respectively of all non-cash transactions. Cheques were also quite popular in Portugal (29% of total non-cash transactions) and Italy (24%). In Finland and Luxembourg, on the other hand, the use of cheques was very marginal, representing just 0.1% of total non-cash transactions. Cheques also accounted for 9% of non-cash transactions in Spain and for 5% or less in the other euro area countries.

2.3 Recent developments

The most notable recent development in the usage of payment instruments by non-banks is the increased tendency for consumers to issue and transmit payment instructions electronically to their banks. Banks in the euro area are actively taking advantage of recent advances in technology and are increasingly offering internet-based and mobile phone-based banking to complement established forms of remote banking, like self-service banking, home banking and phone banking. Acceptance of those new media by consumers for payment purposes depends on the availability and cost structure of the underlying technology, which vary quite significantly between individual countries. Recent initiatives by the banking sector to standardise and simplify the use and enhance the security features of internet banking, electronic bill presentment and payment (EBPP) and e-money schemes should facilitate this process.

Although there has been a lot of discussion about the use of e-money and its importance, it is still not a widely used medium. In 2000 only 0.4% of all non-cash transactions were conducted using e-money. A number of national e-money and prepaid card schemes are preparing or currently testing the adaptation of their cards for use in internet transactions, either through an online verification procedure or through a plug-in terminal for personal computers. Such an expansion in the features of those cards could eventually lead to a stronger demand from the consumer side, and growing familiarity with this means of payment could stimulate its use.

3. Interbank exchange and settlement systems

3.1 The real-time gross settlement system: TARGET

The Trans-European Automated Real-time Gross settlement Express Transfer (TARGET) system is the RTGS system for the euro. It is a decentralised system consisting of 15 national RTGS systems, the ECB payment mechanism (EPM) and the Interlinking system. The latter connects the national RTGS systems and the EPM by means of common procedures which allow payment orders to move from one system to another. The system successfully commenced live operations on 4 January 1999 with some 5,000 participants throughout the European Union.

The decision to construct the TARGET system was taken by the Council of the European Monetary Institute (EMI) in March 1995. TARGET was developed to meet three main objectives: first and foremost, to facilitate the integration of the euro money market in order to allow for the smooth implementation of the single monetary policy; second, to improve the soundness and efficiency of payments in euros; and third, to provide a safe and reliable mechanism for the settlement of payments on an RTGS basis, thus contributing to a minimisation of risks in making payments. In order to achieve these objectives, TARGET offers the possibility of transferring central bank money on a cross-border basis as smoothly as in the domestic market, making it possible to reuse these funds several times a day.

In order to minimise the time required and the costs to the central banks and credit institutions of establishing TARGET, it was agreed to harmonise national RTGS systems only to the extent necessary to ensure both uniformity in the implementation of the monetary policy of the ECB and a level playing field for credit institutions. Although several technical and organisational features continue to differ between NCBs, TARGET has been set up in such a way that the use of the system is very similar for participants, whether in domestic or in cross-border mode.

A unique feature of TARGET is that its euro payment services are available throughout the European Union, which is a wider area than that in which the single currency has been adopted. Indeed, the three EU countries which have not yet adopted the euro (Denmark, Sweden and the United Kingdom) are connected to TARGET. Since it is necessary for all countries adopting the euro to participate in TARGET, and as the time that was available to set up the system was limited, all EU NCBs had to start investing money in TARGET before they knew whether they would be part of the euro area. Thus, in 1995, the EMI Council agreed that all current EU NCBs should be ready to connect to TARGET by 1999. It was pointed out, however, that for those countries which did not adopt the euro from the outset, the connection would be subject to certain conditions which were subsequently decided by the Governing Council of the ECB.

3.1.1 *Operating rules*

The rules governing TARGET and its operation can be found in the Guideline of the European Central Bank on a Trans-European Automated Real-time Gross settlement Express Transfer system ("TARGET Guideline") and the sets of rules and procedures contained in the national regulations and/or contractual provisions ("national RTGS rules") applying to each of the national RTGS systems and the EPM which are the component parts of TARGET. The TARGET Guideline came into effect on 1 January 1999, ie the starting date of stage three of EMU.

The TARGET Guideline applies to the ECB and the NCBs participating in the Eurosystem. It includes provisions on, inter alia, a number of minimum common features with which each national RTGS system participating in or connected to TARGET has to comply (eg access criteria, currency unit, pricing rules, time of operation, rules referring to what kind of payments may be processed through TARGET, when a payment order should be processed or when a payment order is considered to be irrevocable, and intraday credit); arrangements for cross-border payments through the Interlinking system; security strategy and security requirements for TARGET; provisions establishing the framework for the audit of TARGET; and the management of TARGET.

An agreement has been entered into by the Eurosystem and the NCBs of the member states which did not adopt the single currency on 1 January 1999. It provides a mechanism through which the NCBs of member states outside the euro area are able to connect to TARGET and adhere to the rules and procedures referred to above. Some modifications and refinements have been made to these rules and procedures in order to take into account the special situation of the NCBs of member states outside the euro area.

3.1.2 *Participation in the system*

According to the TARGET Guideline, only supervised credit institutions as defined in the first indent of Article 1 of the First Banking Coordination Directive⁵ which are established in the European Economic Area (EEA) can be admitted as direct participants in a national RTGS system. In addition, as an exception, the following entities may also be admitted as participants in a national RTGS system subject to the approval of the relevant NCB:

- treasury departments of central or regional governments of member states active in money markets;
- public sector bodies of member states authorised to hold accounts for customers;
- investment firms established in the EEA which are authorised and supervised by a recognised competent authority; and
- organisations providing clearing or settlement services subject to oversight by a competent authority.

The criteria for participation in a national RTGS system are set out in the RTGS rules concerned and are available to the interested parties. RTGS rules require reasoned legal opinions, based on the Eurosystem's harmonised terms of reference for legal opinions, to be requested from applicants and reviewed by the relevant NCB. The harmonised terms of reference are available to interested parties. Capacity opinions (which establish that an applicant is legally able to conclude agreements) are requested for each individual (domestic and foreign) applicant when joining the system, unless such opinion has been received in another context. Country opinions (which establish that there are no foreign legal provisions which could have adverse effects on the agreements concluded) are requested from the jurisdictions of foreign participants, whether they are incorporated in an EEA or a non-EEA country.

All credit institutions participating in national RTGS systems automatically have access to the cross-border TARGET service.

⁵ This is now incorporated into Directive 2000/12/EC of the European Parliament and of the Council of 20 March 2000 relating to the taking up and pursuit of the business of credit institutions.

It is also possible for credit institutions to access TARGET remotely. Remote access to settlement facilities in TARGET is defined as the possibility for an institution, established in a country in the EEA, to become a direct participant in an RTGS system in TARGET in another country and, for that purpose, to have a settlement account in euros in its name with the central bank of that country without necessarily having established a branch or subsidiary in that country. Such credit institutions can only participate in TARGET on a positive balance basis as they do not have recourse to intraday credit or to the Eurosystem's marginal lending facility.

Regarding electronic money institutions (ELMIs), the European Commission has interpreted that they are not covered by the definition of credit institutions in the SFD. Consequently, ELMIs would not be "institutions" within the meaning of the SFD and could not be regarded as "participants" in systems designated under the SFD. As a result, the participation of ELMIs in TARGET would not be advisable, as this could jeopardise the irrevocability and finality of payments processed through the system. Therefore, the Governing Council has decided that ELMIs are not eligible participants in TARGET as long as uncertainties remain with regard to their protection under the SFD.

3.1.3 Types of transaction handled

TARGET can be used for all credit transfers in euros. It processes both interbank and customer payments and there is no upper or lower limit placed on the value of payments. All payments are treated equally, irrespective of their value.

The following types of transaction are handled by TARGET:

- payments directly connected with central bank operations in which the Eurosystem is involved on either the recipient or the sender side;
- the settlement operations of large-value netting systems operating in euros; and
- interbank and commercial payments in euros.

It is mandatory for the first two types of transaction to be settled through TARGET.

TARGET is also used for the handling of transfers made between ESCB central banks.

3.1.4 Operation of the transfer system

In order to meet the needs of the financial markets in general and of its customers in particular, TARGET provides long daily operating hours: it opens at 7 am and closes at 6 pm ECB time (Central European Time). In order for participants to better manage their end-of-day liquidity, customer payments are subject to a cutoff time set at 5 pm. Furthermore, common closing days apply to TARGET. As a rule, TARGET is closed not only on Saturdays and Sundays, but also on New Year's Day, (Catholic/Protestant) Good Friday, (Catholic/Protestant) Easter Monday, Labour Day (1 May), Christmas Day and 26 December. TARGET closing days are, in effect, non-settlement days for the money market and the financial markets in euros, as well as for foreign exchange transactions involving the euro. The CCBM for the cross-border use of collateral is closed on TARGET closing days.

The TARGET setup can be described as a decentralised system in which payment messages are exchanged on a bilateral basis without a central counterparty. No information on payment orders exchanged is sent to the ECB during the business day. However, in order to ensure the correctness of the processing of the cross-border payments exchanged within the system during the business day and the inter-NCB balance positions resulting from this activity, specific control operations are performed at the end of the day by the End-of-Day Application maintained by the ECB. These operations include a check that all bilateral messages sent by one NCB to another have been received and that the total values of cross-border payments sent and received by the NCBs during the day match. No NCB may close before it has finalised its positions with all bilateral partners.

3.1.5 Transaction processing environment

Cross-border TARGET payments are processed via the national RTGS systems and exchanged directly on a bilateral basis between NCBs. All participants are identified by a Bank Identifier Code (BIC) and are listed in the TARGET Directory, which is available from SWIFT and contains BICs worldwide.

National RTGS systems and the EPM are connected via the Interlinking system, which is composed of a telecommunications network linked in each country to a local interface called the national Interlinking component. These components consist of infrastructures and procedures which are used within or in addition to each RTGS system to process cross-border payments. The role of the Interlinking components is, among other things, to convert the presentation of payment data from the national standard into the Interlinking standard and vice versa.

The technical design of the national RTGS systems and the Interlinking components (RTGS operating systems, hardware and software, development tools, design of links between technical components, etc) falls under the responsibility of the individual NCBs and the ECB, subject to some minimum common security features and performance requirements which have been defined for RTGS systems linked to TARGET. Areas which have been subject to harmonisation include operating time, pricing and the provision of intraday credit. Given that TARGET incorporates RTGS systems which have been established under local conditions, the payment services offered to the end users of different national systems are not fully identical. The Interlinking procedures, however, are the same for all countries.

A test centre is maintained at the ECB so that the NCBs and the ECB can test the compliance of their systems with the Interlinking Specifications. All relevant new or amended software facilities have to be tested before being integrated for multilateral testing and for subsequent live operation in TARGET.

3.1.6 Settlement procedures

TARGET is a real-time gross settlement system. Payment transactions are settled one by one on a continuous basis in central bank money.

In order to initiate a cross-border payment, the ordering credit institution sends a payment order to the local NCB through the local RTGS system. The sending NCB checks the validity of the payment (it has to be presented according to the agreed standards and contain the information needed) and the availability of sufficient funds or overdraft facilities. The sending NCB also checks that the receiving RTGS is operational.

The sending NCB is entrusted with the tasks, if necessary, of converting the payment order into the message standard which is used by the Interlinking system, of including the additional security features used for the communication between NCBs and of sending the message through the Interlinking network to the receiving NCB. Once the sending NCB has checked the validity of a payment message and the availability of funds or sufficient overdraft facilities, the amount of the payment is debited irrevocably and without delay from the RTGS account of the sending credit institution and credited to the Interlinking account of the receiving NCB.

As soon as the receiving NCB receives the payment message, it checks the security features and verifies that the beneficiary bank, as specified in the payment order, is a participant in the domestic RTGS system. If this is the case, the receiving NCB converts, where appropriate, the message from the Interlinking standard into the domestic standard, debits the Interlinking account of the sending NCB, credits the beneficiary's RTGS account and delivers a positive acknowledgement to the sending NCB/ECB. Finally, the receiving NCB sends the payment message, through the local RTGS system, to the beneficiary credit institution. If the receiving bank is not a participant in the RTGS system, the receiving NCB rejects the payment message and asks the sending NCB to recredit the amount to the sending bank's account.

3.1.7 Credit and liquidity risk

TARGET settles payments in central bank money with immediate finality. In TARGET, the account of the receiving institution is never credited before the account of the sending institution has been debited. As a result, there is always the certainty for the receiving institution that funds received through TARGET are unconditional and irrevocable. The receiving institution is therefore not exposed to credit or liquidity risk originating from such payments received.

The availability and cost of liquidity are two crucial issues for the smooth processing of payments in RTGS systems. In TARGET, liquidity can be managed very flexibly and it is available at a low cost, since minimum reserves - which credit institutions are required to hold with their central bank - can be used for settlement purposes during the day and intraday credit is provided free of charge. Moreover, the averaging provisions applied to minimum reserves allow for flexibility in the banks' end-of-day liquidity management. The overnight lending and deposit facilities also allow for "last minute" reactions

to unexpected liquidity situations. In addition, the Eurosystem provides intraday credit free of charge. However, all central bank credit has to be fully collateralised. The range of eligible collateral is very wide. Assets eligible for monetary policy purposes are also eligible for intraday credit.

3.1.8 Pricing

The charge for TARGET cross-border payments (excluding VAT) between direct participants is based on the number of transactions sent by a participant within a single RTGS system according to the following degressive scale:

- EUR 1.75 for each of the first 100 transactions per month;
- EUR 1.00 for each of the next 900 transactions per month; and
- EUR 0.80 for each subsequent transaction in excess of 1,000 per month.

The cross-border fee does not depend on the destination or on the value of the payment. Fees are charged only by the sending NCB/ECB to the sending participants in the national RTGS system/EPM. No fees are charged by the receiving NCB/ECB to the receiving participant.

The cross-border TARGET fee structure does not include the costs of the telecommunications link between the sender and the national RTGS system in which the sender is a participant. The fee for this telecommunications link is paid according to domestic rules.

RTGS systems may charge extra fees for any additional services they may provide (eg the acceptance of paper-based payment instructions).

The price of domestic RTGS transfers is determined at the national level by the NCBs. When determining the price structure, the NCBs take into account the principles of cost recovery, transparency, an open market economy with free competition and non-discrimination. They must also take into account the fact that the fees for domestic and cross-border transfers should be in the same range so as not to affect the singleness of the money market. These fee structures are disclosed to interested parties.

3.1.9 Statistical data for TARGET

The turnover figures in TARGET have steadily increased since January 1999. In 2001, the daily average of payments processed by the system as a whole (ie both cross-border and domestic payments) was 211,282, representing a value of EUR 1,299 billion. TARGET cross-border traffic amounted to 39.0% of the total TARGET value in 2001, compared with 41.8% in 2000, and to 21.4% of the total TARGET volume, compared with 21.2% in 2000. Of the cross-border TARGET payments, 96.5% in terms of value and 60.8% in terms of volume were interbank transactions, with the remainder being customer payments. The average value of a cross-border interbank payment was EUR 17.7 million and the average value of a cross-border customer payment was EUR 1.0 million. More detailed statistics can be found in the statistical tables and on the ECB's website (www.ecb.int).

3.2 The EURO 1 system of the Euro Banking Association

3.2.1 Institutional setup

The Euro Banking Association (EBA) is a cooperative undertaking between EU-based commercial banks and EU branches of non-EU banks. With EURO 1, it provides a multilateral large-value EU-wide payment system for euro credit transfers.

The system is governed by three bodies, which have been established under French law. First, there is the Euro Banking Association (EBA), which is an umbrella organisation intended to be a forum for exploring and debating all issues of interest to its members, in particular issues related to euro payments and the settlement of transactions in euros. Second, there is the EBA Clearing Company, which operates the EURO 1 system. It has its registered office in Paris and its shareholders are the clearing banks. The EBA Clearing Company was set up by the Euro Banking Association (EBA) and incorporated for the purpose of operating and managing the EURO 1 system. The EBA defines the general principles for the Clearing Company. Third, there is the EBA Administration Company, which was set up to provide administrative services, in particular human, technical and other support to the

EBA and the Clearing Company. The relationship between the EBA, the EBA Clearing Company and the EBA Administration Company is governed by a master agreement.

3.2.2 Participation and access criteria

EURO 1 is an international system. As at 31 December 2001 there were 73 clearing banks participating in EURO 1. These banks are from all the EU member states and five non-EU countries (Australia, Japan, Norway, Switzerland and the United States), but all banks concerned are incorporated in the European Union or have branches located in the European Union. There are three sets of access criteria for EURO 1: legal, financial and operational.

The legal criteria stipulate that each participant or applicant must be a bank with a registered office in a country which belongs to the Organisation for Economic Co-operation and Development (OECD) and is recognised by the EBA Clearing Company as a “qualifying jurisdiction” (see below). Its system office, ie its operating branch or, subject to certain preconditions, its operating subsidiary, should be located in the European Union, and it should be a member of the EBA. The participant (or applicant) should provide a legal opinion to substantiate its ability to participate in the system (capacity opinion) and to confirm that the Single Obligation Structure (SOS - see Section 3.2.3), which is the legal basis of the system, is recognised and enforceable in the country in which the participant is incorporated and/or its system office is located (country opinion). This country opinion need only be provided once. Afterwards the country will be added to the list of jurisdictions which recognise the SOS (“qualifying jurisdiction”).

The financial criteria are that a participant has own funds of at least EUR 1,250 million and a short-term credit rating of at least P2 attributed by Moody’s Investors Service, Inc. or A2 attributed by Standard & Poor’s Rating Services, or any other short-term rating recognised by the EBA Clearing Company.

The main operational criteria are as follows: (i) any participant or applicant must be a direct participant in an EU RTGS system connected to TARGET; (ii) a system office must be designated for participation in EURO 1; (iii) adequate technical and operational facilities must be provided which meet the technical specifications laid down by the EBA Clearing Company and their operational reliability and robustness should be certified by the EBA Clearing Company; and (iv) the EBA Clearing Company must be notified of all branches, offices and subsidiaries located in the European Union which may participate as indirect members via a clearing bank. The clearing bank would be responsible for the activities of such indirect members and should ensure their proper technical and operational performance in accordance with the rules. The admission of an applicant is subject to a vote by the shareholders of the Clearing Company, ie the clearing banks.

In November 2000, the EBA launched the STEP 1 initiative for cross-border retail payments (see Section 3.3.3.4).

3.2.3 Rules of the system

EURO 1 operates under the Single Obligation Structure (SOS), a legal structure subject to German law whereby the participants agree to enter into a contractual agreement that on each settlement day, at any given time, each participant will have only one single payment obligation or claim with respect to the community of other participants as joint creditors/debtors. In accordance with the SOS, the processing of payments in EURO 1 will entail no bilateral payments, claims or obligations between participants. Nor will there be any form of setoff, novation or netting resulting from the continuous adjustment of the participants’ claim or obligation. The SOS is intended to prevent any unwinding in the event of a participant being unable to honour its single obligation at the end of the day.

3.2.4 Types of transaction handled

EURO 1 processes credit transfers only. Although there are no restrictions as regards the value or the originator of the transactions processed, the EBA intended EURO 1 as a system which should primarily focus on processing large-value payments made by the EBA participants.

Furthermore, the balances of the EBA’s cross-border retail credit transfer service STEP 1 are settled via a EURO 1 participant in the EURO 1 system. The setup of STEP 1 is such that a bank which has joined the EBA’s STEP 1 arrangement is able to submit and receive low-value payments to or from

other STEP 1 banks and settle the netted balances via a EURO 1 bank which is acting as its settlement agent. (Detailed information on the STEP 1 service is provided in Section 3.3.3.4.)

3.2.5 Transaction processing environment

The continuous calculation of the single obligation or claim of each participant is carried out by the system computer located at SWIFT, which provides the network and transmission facilities for EURO 1 and acts as processing agent.

The hardware and software equipment used by the EBA for the management of EURO 1 - including the EBA monitoring station for the clearing phase and the Business Administration System (BAS) for the settlement phase - is duplicated at a backup site. SWIFT provides two operation centres for the Euro Clearing System (ECS): one in the Netherlands and the other in the United States. At both sites, clearing activity is mirrored by a second set of equipment at all times.

3.2.6 Settlement procedures

EURO 1 settles at the end of the day in central bank money at the ECB. The relevant provisions are set out in the Settlement Service Agreement concluded between the EBA and the ECB. After the cutoff time (4 pm Central European Time), clearing banks with debit positions will pay their single obligations into the EBA settlement account at the ECB through TARGET. After all amounts due have been received, and upon instruction from the EBA Clearing Company, the ECB will pay the clearing banks with credit positions, also through TARGET.

3.2.7 Credit and liquidity risk

EURO 1 payments cannot be cancelled once they have been processed by the system. Each processed payment leads to an adjustment of the single claim or obligation of the participant. However, settlement of the single claim or obligation occurs only after the cutoff time, and the participants continue to be subject to certain credit and liquidity risks until final settlement in central bank money.

As a tool for managing risks, each participant must establish credit lines for all other participants individually (varying from a minimum of EUR 5 million to a maximum of EUR 30 million). On the basis of these bilateral credit lines, the system determines for each participant the multilateral debit cap (sum of limits set for a participant by each other participant) and credit cap (sum of limits set by a participant for each other participant). These multilateral debit and credit limits, which are capped at EUR 1 billion, are binding throughout the operating day. No payment that would cause a breach of any limit is processed by the system at any time. Instead, any payment order which would cause the limit to be exceeded is queued. Participants can change bilateral limits on a daily basis according to their assessment of the creditworthiness of counterparties.

A standby liquidity pool, covering the maximum debit position possible in the system, ie EUR 1 billion, is held at the ECB. It enables the system to complete settlement in the event that one or more participants fail to settle their single obligation at the end of the day, up to a total amount not exceeding the balance in the liquidity pool. Each participant contributes to the liquidity pool in equal shares. Each share is assigned or pledged to the benefit of the other participants, so that the amount deposited in the pool can be used to cover the settlement obligations of failing participants. The ECB can only use the cash deposited in the pool to complete settlement if it receives an instruction from the EBA Clearing Company to activate the pool. In the event that the pool is used partially or entirely to complete settlement at the end of the day, the participants must replenish it before the start of processing the following day.

In the event of failures to settle representing an amount in excess of the balance of the liquidity pool, surviving participants will be obliged to provide additional liquidity in order to complete daily settlement. In the event of failures of up to three banks, the amount of liquidity to be provided by each surviving participant is proportional to the credit (representing the bilateral limit) granted to the failing participants. If more than three banks fail on the same day, the amount of liquidity to be provided by each participant is proportional to their multilateral credit limit (market crisis scenario). Losses are allocated according to the same mechanisms.

The establishment, maintenance and activation of the liquidity pool at the ECB is governed by the Deposit Agreement⁶ between the ECB and the EBA for the benefit of the banks participating in EURO 1 as third-party creditors.

3.2.8 Pricing

The transaction fee for a EURO 1 payment is based on the number of payments sent by participants according to the degressive scale below.

Average daily number of transactions during the invoice period	Charge per transaction (in cents)
less than 800	18
from 800 to 1,499	16
from 1,500 to 2,499	14
from 2,500 to 3,499	13
from 3,500 to 4,499	12
from 4,500 to 5,499	10.5
5,500 and above	9.5

In addition, EURO 1 clearing banks have to pay an annual fee of EUR 10,000 to the EBA Clearing Company. The annual operating charge of the processing agent (SWIFT) and the operating costs of the EBA Clearing Company are shared quarterly among the clearing banks according to a special distribution key.

3.2.9 Statistical data for EURO 1

The turnover figures in EURO 1 have steadily increased since January 1999. The average number of transactions in EURO 1 in 1999 was 67,895 payments per day with a total value of EUR 170.7 billion. In 2001 the average number of transactions increased to 113,000 payments per day with a total value of EUR 205.2 billion.

3.3 Cross-border retail payment systems

3.3.1 E-money schemes

So far, two initiatives have been taken to enable the cross-border use of electronic money schemes in euros. The first one, the PACE project (Purse Application for Cross-border use in Euro), was an interoperability initiative launched by CETREL (Centre de Transferts Electroniques) with miniCASH in Luxembourg, by ZKA (Zentraler Kreditausschuss) with GeldKarte in Germany, and by Groupement des Cartes Bancaires and SEME (Société Européenne de Monnaie Electronique) with Moneo in France. The European Commission contributed to the financing of the project within the scope of its IST (Information Society Technologies) programme. The project ran from July 2000 to June 2001. The three domestic electronic purses in the project were first interlinked on the basis of their current standards to enable euro-denominated payments in Luxembourg, Germany and France. The three schemes committed themselves to adopting gradually the Common Electronic Purse Specifications (CEPS).

The second project, Ducato, was set up to validate the CEPS technology in a real environment and to demonstrate interoperability between different electronic purse systems based on CEPS. The project

⁶ The Deposit Agreement is based on §328 (1) of the German Civil Code.

ran from September 2000 to December 2001. The partners involved in the initiative included Banksys, Groupement des Cartes Bancaires, Europay International (now MasterCard Europe), Interpay Nederland, Proton World, Sermepa, Sistema 4B and Visa International. In addition to the domestic e-purse brands of Belgium, France, the Netherlands and Spain, the international e-purse brands Clip (Europay International) and Visa Cash (Visa International) were included in the project. Domestic transactions were cleared through the existing clearing networks and international transactions were cleared through either the VisaNet network (for Visa Cash-branded cards) or the EPSNet network (for Clip-branded cards). A general migration of the existing e-purse schemes towards CEPS is foreseen.

3.3.2 Card-based schemes

For the card-based schemes MasterCard and Visa, see the chapter "International payment arrangements".

3.3.3 Retail credit transfer systems

Apart from bilateral correspondent arrangements among banks, some networks have been established between groups of banks for the purpose of enabling customers to make low-value retail payments across borders.

3.3.3.1 TIPANET

TIPANET (Transferts Interbancaires de Paiement Automatisés) is a network of member banks from the cooperative banking sector which have set up an arrangement for the execution of cross-border bulk payments. The respective local payment systems can be accessed via the receiving correspondent banks. Cooperative banks from six countries set up an association called TIPA Group, S.C. in 1993. TIPANET is in fact a network of 11 cooperative banks from eight countries, not only in Europe, but also overseas, namely in Canada. In addition, some banks have established their own international correspondent networks, which apply the TIPANET standards without being members of the TIPA Group, S.C. For example, the German cooperative banking association has an international clearing network with 25 partners in a total of 18 countries.

Each TIPANET member is free to seek out the most suitable international partners for its business interests, its business tradition and its international trade relations.

TIPANET processes credit transfers, direct debits and cheques, of which credit transfers account for the biggest share of transactions processed. The maximum amount of a transaction that can be transferred corresponds to the balance of payments reporting threshold in the recipient's country. The beneficiary should usually receive TIPANET payments within two business days.

The local correspondent collects all payment instructions and converts them into the TIPANET message format, which complies with the SWIFT MT 102 message. The TIPANET format is sufficiently open to allow for the processing of credit transfers as well as for the processing of cheques. After collecting the payment orders, the local correspondent creates payment batches, which are then sent to the respective foreign correspondent, which will then convert the data into its domestic format and process the payments in the relevant local payment system. The cutoff time for the exchange of files is 4 pm (local time of the receiving bank) on the day before processing. The beneficiary's account will usually be credited two days later.

The settlement of payments takes place via the existing reciprocal accounts, which the correspondents hold for each other (loro and nostro accounts). The conditions for settlement are agreed bilaterally between the banks concerned.

Fees are charged individually by each participant bank. The fees are often differentiated according to the type of customer and the way in which the payment instructions are submitted (paper-based or in electronic form).

The next steps are the increase of the transaction ceiling to EUR 50,000 and the exchange of direct debit files, not only at a cross-border level, but also at the national level.

3.3.3.2 Eurogiro

Eurogiro was established in 1989 as a cooperation between the postal and giro organisations to build a network for the exchange of cross-border payments. The participants act as correspondents for each other.

In July 2002, the group consisted of 39 members in 37 countries. All EU countries and seven accession countries are covered, as well as the United States and Japan. Not all participants belong to the postal bank sector. Some commercial banks also act as access points in some countries.

Eurogiro processes credit transfers and cash-on-delivery orders. The network uses SWIFT message formats for transferring the payment (MT 100, MT 100-20, MT 00-50/60) and achieves a high level of straight through processing in the interbank chain.

The payments are executed through reciprocal accounts (nostro and loro accounts) which the correspondents hold for each other. Eurogiro is run by Eurogiro Network A/S, which is based in Denmark. It is a limited company and is owned by 16 European post office banks/postal financial services companies.

Eurogiro has laid down some internal standards which must be met by participants in order to be able to process payments via the network. The standards address areas such as accessibility and maintenance of the system, formatting of transactions, time scales for the processing of standard payments and key interbank transactions, as well as transparency of customer pricing (no regulation of the pricing in itself).

Eurogiro offers solutions for both large payments and small payment business and stipulates no minimum business size.

Types of transaction handled

Eurogiro handles any commercial payments. The bulk of its business is in the area of low-value payments (credits and cash payments), but it can also process large-value payments as there is no maximum limit on the amounts that can be transferred.

Credit transfers are usually credited to the beneficiary's account within three business days. The execution time can be reduced to two days if the "urgent" option is chosen. Cash payment orders are normally processed and carried out within five business days.

In general transactions are sent directly from member to member in a decentralised way. Eurogiro can also act as a hub and provide add-on services to the members (such as conversion from MT 100 to MT 103). In general, all consistency and validation checks (risk control) are carried out by the sending institution, not by Eurogiro centrally.

Transactions are formatted according to SWIFT standards and are then wrapped up in the unique Eurogiro envelopes. Implementation of new services is subject to a two-step test programme.

Settlement procedures

Eurogiro payments are settled on a gross basis once a day bilaterally between the members concerned. It is normal practice for Eurogiro members to hold accounts with each other and to settle in the currency of the payment. The members agree bilaterally on the terms and conditions of the accounts (statements, interest, minimum deposit, etc).

Eurogiro has entered into a settlement arrangement with Postgirot Bank in Sweden (now owned by Nordea) as the single settlement service provider for euro payments. Postgirot Bank will keep accounts for all members and act as the single point of entry in the settlement of euro payments. The service went live on 2 November 2001.

Pricing

In 2001, participants paid:

- a monthly service fee (network licence fee, software service, maintenance of encryption equipment) of between EUR 1,200 and EUR 2,100 (depending on the number of transactions processed); and
- additional costs for extra installation units.

Transaction fees are not dependent on the type of transaction. They are only differentiated according to the number of transactions sent:

Flat transaction fee	Transaction tiers	Fee per transaction
Minimum monthly fee EUR 1,000	0-8,000	EUR 0.25
	8,001-40,000	EUR 0.12
	40,001-80,000	EUR 0.07
	80,001 +	EUR 0.03

A discount for large numbers of payments sent on the same day to the same institution (eg pension payments) is available.

Statistical data

Eurogiro records the number of transactions processed on the network, but not the value of individual transactions. Statistics are issued monthly and the daily averages below are calculated on the basis of the monthly statistics (1 year = 252 days).

Key figures are:

Sent transactions	1998		1999		2000	
	average day	year	average day	year	average day	year ¹
Credits	18,963	4,778,645	18,104	4,562,273	19,972	3,774,664
Cash	7,821	1,970,784	16,084	4,053,136	28,613	5,407,803
Interbank	68	17,229	123	31,082	239	45,193
Total	26,852	6,766,658	34,311	8,646,491	48,824	9,227,660

¹ January to September 2000 (189 days).

A survey in spring 2000 revealed that the average transaction size in Eurogiro was EUR 2,375.

3.3.3.3 S-Interpay

S-Interpay was set up in 1994 by the German savings banks and their central institutions, the Landesbanken, to facilitate cross-border payments. Since then the system has expanded and it now consists of a network of correspondent banks in the European Union and beyond. Detailed access criteria are not published. However, participants are mainly from the savings banks sector. The services of S-Interpay are available to all members of the European Savings Bank Group and, in principle, also to other commercial banks.

In general, one bank in each country functions as the central correspondent for that country. However, in larger countries there may be two or more correspondents, which then take care of the relationships with particular foreign countries. The correspondent "collects" all payment orders which are to be transferred abroad from the participants. These payment orders are transferred to the foreign correspondent, which will then convert the data into the domestic format and process the payment within the relevant local payment system. The network only handles cross-border credit transfers for amounts of up to EUR 10,000 (or the equivalent value in the relevant currency). It is planned to increase this limit to EUR 50,000 in the future.

Cross-border payment orders can be submitted up until 2.30 pm each day for processing on the following business day. The payment orders are then sent to the correspondents abroad, which under normal circumstances enter the payment instructions into their domestic clearing systems the following business day.

Processing is automated throughout the interbank chain. Straight through processing is possible by using the SWIFT MT 102 message format as the standard format. The exchange of payments between correspondents takes place on the basis of file transfers. Payment orders which do not meet the agreed standards are automatically rejected and returned to the sender. No repair work is carried out on the recipient's side.

Cover payments are made in the form of TARGET or EURO 1 payments to the respective foreign correspondent. If currencies other than the euro are to be settled the settlement takes place via existing accounts which the correspondents hold for each other.

The correspondent banks in the various countries have concluded service level agreements which address issues such as message standards and formatting rules as well as execution time and settlement rules.

Charges for cross-border service are determined by the individual banks participating in the S-Interpay system. Charges are always based on a flat fee.

S-Interpay has already reached a high level of straight through processing with the implementation of the IBAN and SWIFT MT 103 message types. There are plans to develop new software which is capable of settling domestic as well as cross-border payments.

3.3.3.4 STEP 1 initiative of the Euro Banking Association

The STEP 1 initiative of the EBA entered into operation on 20 November 2000. Its main aims are to enable a reduction in the execution time of cross-border retail payment instructions, to foster the use of industry standards for messaging in order to enhance straight through processing within banks, and to develop and encourage the adoption of European business practices in the execution of cross-border retail payment instructions.

STEP 1 uses the existing infrastructure of the EBA's EURO 1 system for large-value payments without being subject to the risk management requirements of the large-value segment, and allows access to a greater number of banks. In fact, STEP 1 has a two-tier membership: the EURO 1 clearing members and, in addition, any other bank which is not a member of EURO 1 but acquires the status of a STEP 1 bank and uses a EURO 1 clearing bank as a "settlement bank" for its low-value payments.

Participation in the system

The EBA's STEP 1 arrangement is open to all banks which have a system office (ie an office from where they are connected to STEP 1) located in an EU member state and are either EURO 1 banks or have appointed a EURO 1 bank to act as their settlement agent within EURO 1. As at 15 July 2002, 85 banks were participating in the STEP 1 arrangement.

Types of transaction handled

STEP 1 can be used for the processing of credit transfers, which should be below EUR 50,000, although there is no actual limit. As of late 2002, the system will also be able to process direct debits.

Operation of the transfer system

STEP 1 is set up in such a way that a bank which has joined the STEP 1 arrangement with the EBA and which is not at the same time a participant in the EURO 1 system (a STEP 1 bank) is able to submit and receive low-value payments to or from other STEP 1 banks and settle the netted balances via a EURO 1 bank (its "settlement bank"). The balance calculated for a STEP 1 bank for a particular value date is settled by its settlement bank within the EURO 1 system.

Transaction processing environment

STEP 1 uses the technical platform of EURO 1 for the processing of low-value payments.

In order to distinguish STEP 1 payments from EURO 1 payments, the former carry a specific three-letter tag in field 103 of the SWIFT message ("ERP" for Euro Retail Payment). A payment with an "ERP" tag is automatically captured by SWIFT, which forwards a partial copy to the EURO 1 platform.

The processing of STEP 1 retail payments is carried out on the EURO 1 platform according to the same technical processing principles as for EURO 1, but in a separate "ERP cycle" on the day of settlement.

The same SWIFT message types as in EURO 1 can also be sent in STEP 1. In particular, the following STEP 1 messages can be sent: SWIFT MT 100, MT 102 and MT 103 messages with the tag "ERP" in field 103. SWIFT MT 202 messages are used for transfers between a STEP 1 bank and its settlement agent. Direct debits will be processed using the SWIFT MT 104 and MT 204 messages.

STEP 1 does not process batch files (other than the MT 102 messages) and does not provide a central sorting function.

Any large-value payments which are sent to or received by a EURO 1 bank, whether for itself or for one of the STEP 1 banks for which it acts as settlement bank, are processed within the credit and debit caps of the EURO 1 bank within the EURO 1 system.

Settlement procedures

Shortly after 9.30 am on day D (settlement day), SWIFT informs each STEP 1 bank, and its settlement bank, of its Potential Net Balance (PNB), which is the total value of payments to be received on day D minus the total value of payments to be settled on day D. Settlement of balances within EURO 1 starts at 10.30 am on day D.

If under exceptional circumstances (eg major technical failures or the breach of the credit or debit cap of one of the settlement banks) STEP 1 payments cannot be processed by 4 pm on day D, they are automatically carried over to the next settlement day.

The balances in STEP 1 will be recalculated in the event that one participant is unable to settle its balances by 10.30 am on day D. After recalculation of the balances at 11.30 am, the banks are informed by EBA Clearing that processing has started again.

Credit and liquidity risk

STEP 1 banks cannot cancel their retail payment orders after 9.30 am on day D. The settlement of EURO 1 balances takes place at the ECB shortly after 4 pm on day D. STEP 1 messages are irrevocable as soon as they are processed on the settlement day. However, STEP 1 banks cannot forward and credit incoming STEP 1 payments to their customers without incurring any credit or liquidity risk until the EURO 1 balances have been settled on day D.

Pricing

One SWIFT MT 102 message, which can contain several STEP 1 payments, is charged by the system at EUR 0.48. The joining and annual fees for STEP 1 banks are EUR 5,000 and EUR 1,000 respectively. STEP 1 banks are entitled to a reduced admission fee to the EBA (EUR 1,000).

3.4 Future developments

3.4.1 Electronic banking

The overall trend seems to be that financial institutions are increasing their efforts to move towards electronic banking, ie online PC banking and internet banking. Online PC banking enables customers to execute bank transactions from a personal computer via a modem, using a financial software program supplied by the bank. Internet banking uses the internet as the medium through which customers can manage their financial affairs. The internet banking software is not stored on the user's personal computer (as with online PC banking) but on the bank's server. Internet banking is expected to have the highest growth potential as users are becoming more familiar with the internet and the ability to access bank activities from different locations may gain in importance. Recent developments in mobile phone technology and digital television, enhancing customer access to internet banking services, may even further increase the use of internet banking. The same applies to accessing banking services, including access to payment systems, via mobile phones. The growth potential in these areas seems to be significant.

Besides providing an online overview of account balances and facilities for the payment of domestic bills and the transfer of funds between domestic accounts, some banks already offer facilities for making cross-border payments via the internet. In the near future, financial institutions are expected to offer more sophisticated services, such as loans, investment products and cross-border retail payments.

The creation of a legal framework for electronic signatures was of great importance for the development of electronic banking. Electronic signatures, which use technologies such as cryptography, allow individuals who receive data over the internet or other online networks to determine the origin of the data and to check whether or not it has been altered. Directive 1999/93/EC of the European Parliament and of the EU Council on a Community framework for electronic signatures was published in December 1999. This Directive aims to ensure that electronic signatures that are subject to certification procedures by third parties are considered legally equivalent to hand-written signatures.

At present, the public and the private sector in Europe are setting up certification institutions and infrastructures for the creation and use of digital signatures. These certification institutions, which may be public authorities, chambers of commerce, federations of notaries or selling agents, credit institutions or issuers of payment cards, act as management and approval centres for the certificates. The banking industry in particular is very active in designing the services which can be used by banks to provide secure and efficient financial services to their customers. However, public authorities are also beginning to get involved. In Spain, for example, it is possible for citizens to fill in their tax return forms electronically. Furthermore, in January 2000 the Finnish Population Centre launched a national digital identity card (HST-card) with a digital signature, which can also be used in place of the conventional personal identity card. The latest developments are intended for mobile commerce solutions. The Finnish Sonera SmartTrust (former Finnish Telecom), for example, has developed an authentication solution for mobile telephones. The technology allows transferred data to be encrypted and signed with digital signatures.

All of these private and public service providers operate on a domestic basis. However, some have started to sign agreements with certification agencies in other countries, such as the Agencia de Certificación Electrónica in Spain, in order to guarantee mutual recognition of certificates. In future, there is expected to be not only a clear growth in the number of national certification agencies offering services on a domestic level, but also an increasing internationalisation of their services.

3.4.2 Card-based payments over the internet

Payment cards are currently the most popular means of making payments over the internet. Credit cards in particular are widely accepted and easy to use, as only the card numbers are sent over the internet. However, there is always a trade-off between ease of use and security, as the unprotected flow of data over the internet could lead to the misuse of credit cards. The Secure Electronic Transaction (SET) standard was introduced to facilitate secure credit card transactions over the internet. Visa is currently developing 3-D Secure and MasterCard is developing Secure Payment Application (SPA), two initiatives for securing credit and debit payments over the internet.

3.4.3 Correspondent banking

The impact of monetary union on the correspondent banking business in the euro area has been substantial, as there is a trend towards a reduction in the number of correspondent banking accounts and a concentration among a few major banks. Immediately after the start of stage three of monetary union developments were still at a preliminary stage. Since then, the trend towards concentration has accelerated. The driving factors behind this trend are new payment systems initiatives (eg CLS), technological innovation and financial sector consolidation. Each of these forces is expected to continue to foster ongoing trends. As a result of the increasing concentration, the nature of "traditional" correspondent banking business is already changing. Some banks have become the settlement institutions of "quasi-systems" or run innovative payment arrangements which combine the features of correspondent banking and funds transfer systems. A further step towards greater concentration is expected to occur as a result of the introduction of euro banknotes and coins, since the correspondent banking relations which used to exist in respect of payments in legacy currencies are no longer needed.

3.4.4 The single euro payment area and the European Payments Council

In the first half of 2002, the European banking industry prepared a White Paper called *Euroland: our single payment area*, with a vision that Europe will gradually develop into a single euro payment area (SEPA) of 500 million citizens and consumers making and receiving over 100 billion non-cash payments each year. These transactions will all be made within a "domestic" euro area market, with

the cross-border transactions of today becoming a relic of the past. The expectation is that everybody will be able to make any payment within the SEPA as easily and inexpensively as in his or her home town.

European banks and banking associations established a European Payments Council (EPC) on 17 June 2002 to represent the industry and to support the development of the SEPA. The EPC has also confirmed a number of objectives that will contribute to increased efficiency for pan-European payments such as:

- establishing a pan-European ACH with fair and open access, able to process credit transfers from 1 July 2003 and direct debits by July 2005;
- phasing out cheques over the long term; and
- achieving a level of STP in the SEPA even higher than in domestic processing today.

The Eurosystem shares the vision of the SEPA and strongly supports its achievement in cooperation with the industry. In this respect, the Eurosystem also welcomes the steps taken to create an effective new governance structure to foster the cooperation and commitment of the banking industry at the euro area level.

3.4.5 Retail credit transfer systems

Towards the middle of 2003, the EBA intends to introduce a complementary arrangement to its current STEP 1 initiative for the processing of retail credit transfers and direct debits, which will be called STEP 2.

STEP 2 will process high-volume commercial and retail payments sent to the system in files containing a large number of payments (batches), unlike STEP 1, which currently processes every payment separately.

STEP 2 will offer a clearing and sorting function. The participating banks will be able to submit all their retail payments for one settlement day in a single batch file to the system. STEP 2's sorting function will open the file, sort the payments according to the recipients and establish the amounts which need to be settled by the participants.

As in STEP 1, the balances calculated in STEP 2 will be settled in EURO 1. In order to ensure straight through processing, the payment messages will initially be based on the SWIFT MT 103+ data set.

At present, it is envisaged to have three different categories of participants:

- settling participant: a EURO 1 bank which is, at the same time, a member of STEP 2 and settles directly in EURO 1;
- non-settling participant: a STEP 2 member which is directly addressable in the system, but settles indirectly via a EURO 1 bank, ie these would be banks participating in STEP 2, but not in EURO 1. This is the same setup as in STEP 1, where members have a "settlement agent" which settles their balances in EURO 1;
- indirect participants: STEP 2 members which are not directly addressable in STEP 2 and settle indirectly via a EURO 1 bank. These would be correspondents of a EURO 1 bank which do not want to join the STEP 2 arrangement themselves.

4. Securities clearing and settlement systems

The introduction of the euro has accelerated the process of consolidation in securities market infrastructures in the euro area which had been initiated by the harmonisation of European domestic securities markets and new developments in technology. This is reshaping the trading, clearing and settlement industries.

This reshaping is, for example, evident from consolidation in the securities market infrastructure, which is taking place both vertically and horizontally. Vertical consolidation is the process of consolidating different activities which take place at various points in the securities transaction chain, such as the integration of trading, clearing, settlement and custody services within a single institution. Horizontal

consolidation includes mergers or alliances between systems providing similar services, such as the merger of two SSSs.

This section describes recent developments in trading, clearing and settlement which have a mainly euro area dimension. Detailed information concerning domestic institutions can be found in the relevant country chapters.

4.1 Trading

The introduction of the euro has eliminated currency segmentation, which was one of the main reasons for the fragmented listing and trading environment in the euro area. This has permitted investors to adjust their portfolios and look beyond their national markets. This is also true for investors from outside the euro area, who see the euro area securities markets as a single market. Increased cross-border trading has put pressure on stock exchanges to integrate their trading platforms in order to provide cost-efficient euro area-wide mechanisms. As a result, there is increased demand for further integration between stock exchanges in the form of cross-border cooperation and mergers.

In addition to traditional stock exchanges, several "alternative trading systems" such as new electronic communication networks (ECNs) offering similar functionality and services to traditional exchanges have been introduced in the euro area.

The common, fully electronic German-Swiss derivatives market Eurex resulted from the first European cross-border merger of exchanges between Deutsche Terminbörse (DTB) and the Swiss Options and Financial Futures Exchange (SOFFEX) in 1998. Furthermore, in 1999 the boards of Eurex and Helsinki Exchanges Group Ltd. (HEX) signed a cooperation agreement for a strategic derivatives market alliance. Concerning the spot market, the Irish Stock Exchange (ISE) and the Deutsche Börse agreed on an alliance through which the ISE operates the electronic trading system for Irish equities ISE XETRA on a special segment of the XETRA trading platform in Frankfurt. Moreover, the Wiener Börse has introduced the electronic trading system XETRA.

In September 2000, the Amsterdam Stock Exchange, the Brussels Stock Exchange and the Paris Bourse were merged into a single stock exchange called Euronext. The three exchanges retain their status as regulated exchanges. They are held by a Dutch limited holding company. Euronext is maintaining its presence in the three countries by having a regulated exchange in each of them, while the exchanges are at the same time becoming increasingly legally and operationally integrated. Since November 2001, the three Euronext cash markets have been using the same order-driven trading platform based on the French NSC trading system. In October 2001, Euronext took over the London derivatives market LIFFE. In February 2002, Euronext and the Portuguese stock exchange (Bolsa de Valores de Lisboa e Porto) announced the conclusion of a merger agreement and, as a result, the formation of Euronext Lisbon. Furthermore, HEX signed a cross-membership agreement with Euronext in September 2001. French and Belgian derivatives trading will move to the Connect platform in the first quarter of 2003.

Consolidation is also taking place in EU accession countries. On 8 February 2002, the Warsaw Stock Exchange SA signed an agreement on reciprocal membership with Euronext N.V. HEX acquired majority ownership of the Tallinn Exchange (TSE) in April 2001 and subsequently, in February 2002, the TSE implemented the HETI trading system of HEX.

Trading in fixed interest instruments has traditionally been dominated by OTC trading. The introduction of the euro has highlighted the need to have facilities for cross-border trading. Alternative electronic trading platforms have emerged, offering services ranging from simple order transmission to fully fledged trade execution facilities such as EuroMTS, CoredealMTS, virt-x, Brokertec and Instinet. Most of these systems are located outside the euro area, but have a high proportion of euro area-based institutions as owners and participants.

As far as the euro area is concerned, the so-called MTS galaxy, composed of several national markets (MTS Italy, MTS France, MTS Belgium, MTS Amsterdam, MTS Portugal and EuroMTS) sharing the same trading technology (the "telematico" system), currently has the most widespread presence among European trading service providers in the fixed income segment.

4.2 Clearing

The clearing landscape in the euro area has remained relatively fragmented since the introduction of the euro. In the derivatives markets, the clearing house acts as a central counterparty (CCP) for exchange-traded instruments, while in spot markets the use of a CCP is not widespread.

Nevertheless, there is a consensus among market participants that clearing with a CCP will play an increasingly important role in reshaping the securities markets. This is due firstly to the increasing use of electronic order-driven trading platforms with trader anonymity and secondly to the rising number of foreign trading firms operating via remote access on the markets, whose activity is perceived by the other counterparties to represent an increase in counterparty risk.

When a clearing house acts as a CCP, it interposes itself as legal counterparty to both sides of a securities transaction. As such, it provides a number of benefits to market participants. For instance, it simplifies the management of counterparty risk by providing a single counterparty instead of several. Even though a CCP does not in itself eliminate credit risk in a market, it redistributes this risk and makes it easier for the firms to manage it. Moreover, a CCP increases the liquidity of the marketplace through netting. Finally, it reduces the number of settlements and therefore the associated risks and operational costs. However, establishing a CCP is not without costs. In particular, it needs a robust risk management system. Thus, several European markets are currently assessing the costs and benefits of having a CCP.

Initiatives among service providers to establish a pan-European CCP are progressing. For instance, the clearing functions of the three Euronext exchanges (Amsterdam, Brussels and Paris) legally merged at the beginning of 2001 into Clearnet (operating in the French market before), which acts as the CCP for all the transactions carried out on Euronext. Euronext Lisbon will also use the clearing facilities of Clearnet. Furthermore, Clearnet, Eurex Clearing and the London Clearing House (LCH) have repeatedly explored the possibilities of various merger combinations.

Discussions on the integration of clearing activities within the market are focusing on issues related to governance, jurisdiction, legal status and types of products. In particular, it is not clear at this stage whether CCP services will be provided through a single entity or through multiple entities across product lines and markets, with multicurrency capability, and consequently how many jurisdictions will be involved.

Integration in terms of international joint ventures has also been visible. An example is the establishment of the European Securities Clearing Corporation (ESCC) as a pan-European clearing house, which was set up by Euroclear and the US Government Securities Clearing Corporation (GSCC) to provide trade comparison and netting services for European government debt securities. The LCH has recently joined this partnership.

4.3 Settlement

Three different solutions have emerged in response to securities market demands for the rationalisation of the European securities settlement industry:

- cross-border links, which are bilateral networks between SSSs. Here, a national SSS provides a single point of entry which allows its customers to hold securities issued in any other SSS and to use these securities within its own country;
- mergers and joint ventures between SSSs. Until now, two major mergers of ICSDs with domestic CSDs have effectively taken place: the merger of Cedel International with Deutscher Kassenverein (the German CSD) resulting in the formation of Clearstream International, and the merger of Euroclear with Sicovam (the French CSD) and Necigef (the Dutch CSD) resulting in the creation of the Euroclear Group. Other initiatives are being carried out at the national level;
- the “relayed links” solution - currently being considered by several SSSs - whereby one SSS acts as an intermediary on behalf of another for the settlement of international business.

Cross-border links

Links between SSSs have been established in order to facilitate cross-border transfers of securities. These links are used for the transfer of collateral for the Eurosystem’s credit operations, as well as for

all interbank operations. In order to be eligible for use in the Eurosystem's credit operations, the links are assessed against the Eurosystem's standards. The links which have been assessed so far allow the cross-border transfer of securities to/from the Eurosystem on a free of payment basis.

In July 2001, the total number of eligible links assessed and approved by the Eurosystem was 66. So far, the use of links has been more modest than expected. In fact, frequent and significant use is only made of 29 of the 66 eligible links. Although the links cover several countries, this activity is concentrated within a few countries and is dominated by the two ICSDs - Clearstream International and Euroclear.

Clearstream International

Clearstream International was formed in January 2000 through the merger of Cedel International (the Luxembourg-based ICSD) and Deutsche Börse Clearing (the German CSD). Deutsche Börse initially held a 50% stake in Clearstream International, but acquired Cedel's 50% stake on 11 July 2002. Clearstream International is an international clearing and settlement organisation with extensive services for equities and bonds for both domestic and international business. The holding company, which is incorporated in Luxembourg, has three main subsidiaries: Clearstream Banking Luxembourg (CBL), Clearstream Banking Frankfurt (CBF) and Clearstream Services Luxembourg. Joint regional offices are used for representation in the major financial centres.

CBF offers clearing and settlement facilities for the German securities markets. CBL also operates LuxClear, which is the Luxembourg CSD.

Clearstream Services Luxembourg provides the single IT platform for international transactions, called Creation, for clearing, settlement and custody. Since CBF's international business was successfully migrated to the platform in February 2001, both CBL and CBF have been using it for international transactions in commercial bank money. CBF continues to operate the settlement system for the German market in central bank money on a separate platform. Settlement currently takes place in several night-time and daytime processing cycles (for further details see Section 4.3.2 of the German chapter).

Euroclear Group

The takeover of the French CSD Sicovam SA by the Brussels ICSD Euroclear Bank took effect in January 2001. As a result, Sicovam SA has been renamed Euroclear France and has become a full subsidiary of Euroclear Bank. Euroclear Bank was created in December 2000 and has taken over the former Euroclear system operating and banking roles.

A common, dual platform for batch and real-time settlement in both central bank and commercial bank money will be available to customers of Euroclear Bank and Euroclear France via a single interface. The respective technology platforms will be rationalised gradually, ultimately leading to a single settlement process.

In December 2000 all Irish government bond settlement activity previously carried out by the Central Bank of Ireland was transferred to the Euroclear System. This arrangement allows financial institutions to hold Irish government bonds and settle domestic and cross-border transactions in a single settlement location. Consequently, the Central Bank of Ireland's own settlement system, CBISSO, ceased operations. However, the Central Bank of Ireland continues to act as registrar for Irish government bonds.

In July 2001, the Euroclear and Euronext groups announced an agreement leading to the absorption of the settlement activities of CIK and Necigef, the CSDs of Belgium and the Netherlands respectively, into the Euroclear group. The shares of Necigef and the settlement activities of CIK were taken over by Euroclear in the first quarter of 2002. Euroclear will provide a unified preferred settlement and custody platform for the Euronext markets. The agreement commits all the parties to integrate the settlement functions of CIK and Necigef into a single platform, in a single entity and under a single legal jurisdiction.

The correspondent central banking model

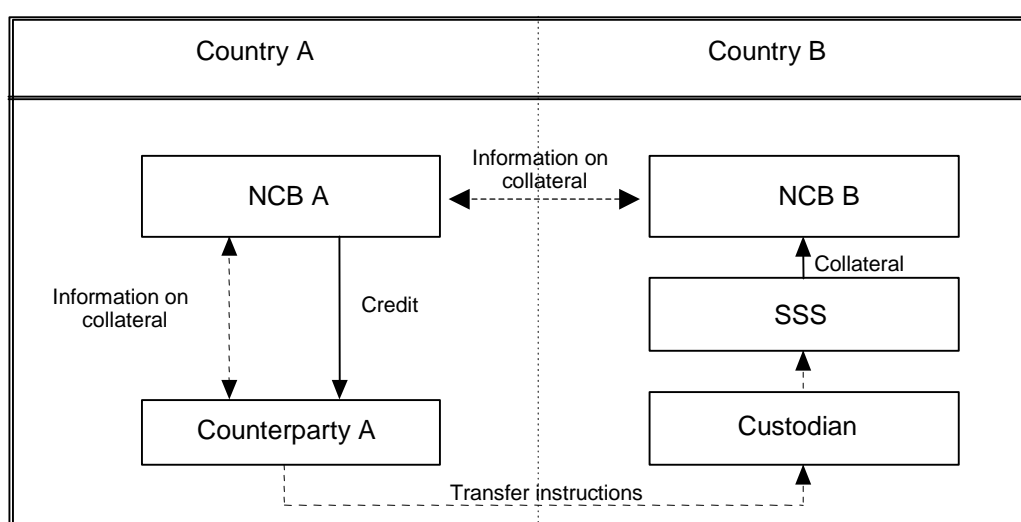
The correspondent central banking model (CCBM) came into operation on 4 January 1999. It was established in order to facilitate the cross-border use of collateral in the Eurosystem's monetary policy operations and intraday credit operations. The Eurosystem's counterparties and TARGET participants in the European Union can only obtain credit from the central bank of the country in which they are

incorporated. However, within the CCBM the NCBs act as securities correspondents for each other, thus enabling counterparties to use all of their eligible assets to obtain credit from their own NCB regardless of where the securities are located (see Chart 1). For the functioning of the CCBM, market participants must make arrangements with the SSSs where the collateral is deposited for the delivery of the securities intended to serve as collateral to an account at the local NCB. Acting as correspondent central bank (CCB), the local NCB will then hold the collateral on behalf of the central bank granting the credit (the home central bank (HCB)).

Chart 1

The correspondent central banking model

The use of eligible assets deposited in country B by a counterparty established in country A in order to obtain credit from the NCB of country A



The CCB is responsible for providing the necessary information on the delivery and eligibility of the securities, while the HCB is responsible for processing that information, as well as for conducting the valuation process and for providing liquidity (ie via a cash payment or by raising a debit cap).

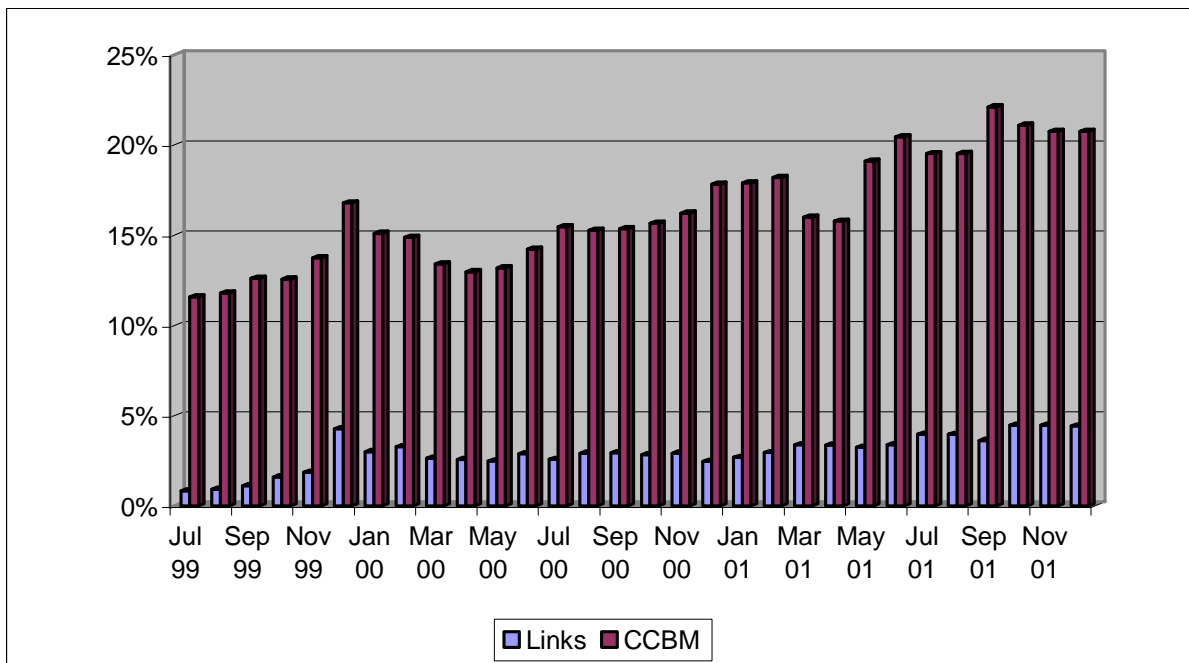
In 2001, collateral submitted to the Eurosystem via the CCBM represented 19% on average of the total collateral provided. This figure is remarkable when compared with the 4% of collateral held in custody through link arrangements between SSSs, the only alternative to the CCBM for transferring cross-border collateral (see Chart 2). The remaining 78% is held domestically.

During 2001 assets held in custody by Eurosystem counterparties through the CCBM averaged EUR 133 billion. The main collateral provider (acting as CCB) was Italy with 32% of the total assets held through the CCBM, followed by Luxembourg (23%), Germany and Belgium (14% each). One reason for the high proportion of collateral provided by Luxembourg and Belgium is that Clearstream Luxembourg and Euroclear, the two ICSDs where eurobonds are deposited, are located in those countries.

The main users of collateral (acting as HCB) were Germany with 48% of the collateral held through the CCBM, the Netherlands (14%), Luxembourg (12%) and Ireland (11%). Owing to the relative scarcity of domestic collateral in Luxembourg and Ireland, foreign collateral held via the CCBM on a cross-border basis amounted to 57% of all collateral held by counterparties in Luxembourg and to 85% of that held in Ireland.

Chart 2

Evolution of cross-border collateral as a percentage of total collateral provided to the Eurosystem



Note: The total collateral provided to the Eurosystem refers to the sum of domestic collateral, cross-border collateral held via the CCBM and cross-border collateral held via the links between SSSs. The first wave of links was approved in May 1999. To date, the Governing Council of the ECB has approved 66 cross-border links.

**Payment systems in
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List of abbreviations

AEX	Amsterdam Exchanges
AFECEI	French Association of Credit Institutions and Investment Firms - <i>Association Française des Établissements de Crédit et des Entreprises d'Investissement</i>
AFEI	French Investment Firms Association - <i>Association Française des Entreprises d'Investissement</i>
ASF	Finance Companies Association - <i>Association des Sociétés Financières</i>
BXS	Brussels Exchanges
BMS	Electronic purse consortium - <i>Billétique Monétique Services</i>
CB	Banking Commission - <i>Commission Bancaire</i>
CECEI	Credit Institutions and Investment Firms Committee - <i>Comité des Établissements de Crédit et des Entreprises d'Investissement</i>
CFONB	French Committee for Banking Organisation and Standardisation - <i>Comité Français d'Organisation et de Normalisation Bancaires</i>
Clearnet SA	Clearing house and central counterparty for financial instruments
CMF	Financial Markets Council - <i>Conseil des Marchés Financiers</i>
CNCT	National Credit and Securities Council - <i>Conseil National du Crédit et du Titre</i>
COB	French Stock Exchange Commission - <i>Commission des Opérations de Bourse</i>
CoMF	Financial and Monetary Code - <i>Code Monétaire et Financier</i>
CRBF	Banking and Financial Regulations Committee - <i>Comité de la Réglementation Bancaire et Financière</i>
CREICs	Regional centres for the exchange of truncated cheques - <i>Centres Régionaux d'Échange d'Images Chèques</i>
CRI	Centre for Interbank Funds Transfers - <i>Centrale des Règlements Interbancaires</i>
Euroclear France	French CSD and clearing authority, previously Sicovam SA
FBF	French Banking Federation - <i>Fédération Bancaire Française</i>
FCC	Central Cheque Register - <i>Fichier Central des Chèques</i>
FNCI	National Register of Irregular Cheques - <i>Fichier National des Chèques Irréguliers</i>
GCB	Bank Card Consortium - <i>Groupement Cartes Bancaires</i>
GSIT	Interbank automated clearing group - <i>Groupement pour un système interbancaire de télécompensation</i>
GUF	SWIFT Users Group in France - <i>Groupement des Utilisateurs SWIFT en France</i>
IEDOM-IEOM	Monetary Institutes of the French Overseas Departments and Territories - <i>Institut d'émission des départements d'outremer, Institut d'émission des territoires d'outremer</i>
ISB	Inter-brokers' subsystem - <i>Sous-système Inter-Sociétés de Bourse</i>
Matif	French financial futures market - <i>Marché à Terme International de France</i>
Monep	Paris traded options market - <i>Marché des Options Négociables de Paris</i>

France

NSC	New electronic trading system used by the French stock exchange since 1995 - <i>Nouveau Système de Cotation</i>
PLC	Automated intraday repo in RGV2 - <i>Pension Livrée Conservatoire</i>
PLI	Intraday repo in TBF - <i>Pension Livrée Intrajournalière</i>
PNS	Paris Net Settlement system
RCB	Bank Card Network - <i>Réseau Cartes Bancaires</i>
Relit	Securities DVP system - <i>Règlement-livraison de titres</i>
RGV	High-speed Relit system - <i>Relit Grande Vitesse</i>
RGV2	High-speed Relit system 2 - <i>Relit Grande Vitesse 2</i>
SBI	Brokers'/intermediaries' subsystem - <i>Sous-système Sociétés de Bourse-Intermédiaires</i>
SCSSs	Securities clearing and settlement systems
SEME	French banking consortium promoting an e-money product called MONEO - <i>Société Européenne de Monnaie Electronique</i>
SFPMEI	Special purpose credit institution for issuing e-money - <i>Société Financière du Porte-monnaie Électronique Interbancaire</i>
Sicovam SA	French CSD and clearing authority - <i>Société Interprofessionnelle pour la Compensation des Valeurs Mobilières SA</i> , now Euroclear France
SIT	French automated clearing house for retail payment instruments - <i>Système Interbancaire de Télécompensation</i>
SLAB	Delivery by mutual consent subsystem - <i>Sous-système de Livraison par Accord Bilatéral</i>
TBF	RTGS system operated by the Bank of France - <i>Transferts Banque de France</i>
TIP	Interbank payment order - <i>Titre Interbancaire de Paiement</i>

Introduction

A number of important reforms have been implemented in France over the past years in the field of payment systems and securities clearing and settlement systems (SCSSs). The main objectives of these reforms were to minimise the risks arising from interbank settlements, to improve efficiency and to ensure the openness of the French systems within the euro area.

The French infrastructure for wholesale transactions is thus characterised by a common platform for settlement in central bank money, composed of three systems linked by real-time bridges:

- at the heart of this organisation is the French RTGS system operated by the Bank of France, TBF, which came into operation in October 1997 and is part of the TARGET system;
- in the field of SSSs, the high-speed Relit system, RGV, started up in February 1998. Thanks to its close link with the RTGS system and a sophisticated mechanism for self-collateralisation, RGV provides for continuous intraday final DVP in central bank money; and
- launched in February 1997, the Paris Net Settlement (PNS) system, which can be described as a hybrid settlement system inasmuch as it offers netting mechanisms while settling in real time and in central bank money.

In the field of retail means of payment and systems, substantial changes have been implemented in order to achieve the dematerialisation of interbank exchanges in 2002. Since February 2002, there has been only one retail payment system, the French automated clearing house (Système Interbancaire de Télécompensation - SIT), through which all retail payments, now including cheques, are cleared.

As for the oversight of these systems, L 141-4 of the Financial and Monetary Code (CoMF), which codifies Article 4 of the 1993 Bank of France Statute, gives a broad competence to the Bank of France to ensure the smooth operation and security of payment and securities systems. This article has been recently broadened in order to strengthen its statutory powers vis-à-vis the issuers of means of payment regarding security matters.

1. Institutional aspects

1.1 The general institutional framework

1.1.1 General legal aspects

1.1.1.1 Issuance of means of payment

The French banking law gives a broad definition of means of payment, referring to “all instruments which, irrespective of the medium or technical procedure used, enable any person to transfer funds”. The issuance and the management of means of payment are defined as banking operations.

The Financial and Monetary Code (CoMF), which codified in this field the Banking Act of 24 January 1984, governs banking activities and the conditions under which they are carried out in France.

According to the CoMF, only credit institutions (Article L 511-5), the Treasury, the Post Office, the public trustee office (Caisse des Dépôts et Consignations), the Bank of France and the monetary institutes for the French Overseas Departments and Territories (IEDOM-IEOM) (Article L 518-1) may conduct banking operations, including the issue and processing of means of payment, as a regular part of their business.

The CoMF also codified the Financial Modernisation Act of 2 July 1996 which implemented the EU Investment Services Directive.

Both banking and financial provisions are compliant with the EU principle of mutual recognition of licences settled by the Banking Directive 2000/12 and the Investment Services Directive. These provisions have been codified in the CoMF in Articles L 511-22 to L 511-28 and L 532-23 to L 532-27.

1.1.1.2 *Functioning of payment and securities settlement systems*

The Act of 31 December 1993 abolished the “zero hour” rule in payment systems by amending the French Banking Act (Article 93-1, now CoMF L 330-1). Since the implementation of this provision, netting arrangements for payment systems have been legally binding in the event of failure by a participant and the finality of payments in RTGS systems cannot be legally challenged, provided the systems comply with the legal definition of payment systems.¹ The protection against any “zero hour” provisions also applies explicitly to SSSs.

The legal basis for collateral arrangements in payment and securities settlement systems is formed by Article 330-2 of the CoMF. This Article stipulates that regulations, master agreements or standardised agreements governing payment or multilateral settlement systems may provide for collateral arrangements in order to secure settlement within the system. The collateral eligible under the specific regime of Article 330-2 is widely defined (transfer of claims, securities, guarantees, etc). The transfer of collateral is performed through a transfer of full ownership without any formal requirement to inform third parties and is enforceable despite the provisions of the Business Reorganisation and Bankruptcy Act 85-98.

1.1.1.3 *Legal basis for oversight functions*

The legislation adapting the Bank of France’s Statute to the provisions of the Maastricht Treaty states that “the Bank of France shall ensure the smooth operation and the security of payment systems within the framework of the tasks of the European System of Central Banks relating to the promotion of the smooth operation of payment systems” (Article 4 of Act 93-980 of 4 August 1993 as amended by Act 98-357 of 12 May 1998, codified in Article L 141-4 of the CoMF). This provision establishes payment and securities systems oversight as an integral part of the Bank of France’s statutory tasks within the Eurosystem.

Having regard to the growing concern about security and public confidence in the field of payments, Act 2001-1062 of 15 November 2001 strengthened the oversight role of the Bank of France in matters of means of payment security and granted it greater means of action thereon, by adding the following amendment to Article L 141-4 of the CoMF:

“The Bank of France shall ensure the security of means of payment, other than banknotes and coins, as defined in Article L 311-3, and the relevance of the standards applicable thereto. If it deems that any such means of payment is insufficiently secure, it may recommend that the issuer take all necessary measures to remedy such insufficiency. If its recommendations are of no avail, it may, after having solicited the observations of the issuer, hand down a negative opinion published in the Official Journal.

For the performance of its duties, the Bank of France shall conduct expert analyses and shall ask the issuer or any interested party for all relevant information concerning means of payment and the terminals or technical facilities associated therewith.”

With respect to securities clearing and settlement systems (SCSSs), Article L 622-7-IV of the CoMF (previously Article 32-16 of the Act of 2 July 1996, as amended by the Act of 2 July 1998), states that the general regulations of the Conseil des marchés financiers (CMF) - Financial Markets Council - shall specify “the general organisational and operational principles of securities settlement systems and the conditions under which the CMF approves the operating rules of such systems, without prejudice to the powers granted to the Bank of France by Article 4 of Act 93-980 of 4 August 1993 on the Statute of the Bank of France and the supervision of credit institutions”. In addition, Act 2001-1168 of 11 December 2001 amended the Article L 141-4 of the CoMF to further clarify the oversight competence of the Bank of France as regards SCSSs. It states that the Bank of France oversees

¹ Article L 330-1-I of the CoMF (previously Article 93-1 of the Banking Act) states that: “an interbank settlement system or a financial instrument settlement and delivery system shall mean a national or international procedure organising dealings between two or more parties that have the status of credit institutions, or institutions or companies referred to in Article L 518-1, of investment firms or clearing house members or of non-resident institutions with comparable status, for the usual execution, whether or not this involves netting, of payment as well as, where financial instrument settlement and delivery systems are concerned, the delivery of financial instruments between said participants. Without prejudice to the provisions of article L 622-7, the system must either have been instituted by a public authority or be governed by a master agreement complying with the general principles of a market-wide agreement or a standardised agreement.”

CCPs and securities settlement systems within the framework of the European System of Central Banks, without any prejudice to the securities regulators' and banking supervisors' competencies.

1.2 Role of the Bank of France

1.2.1 Payment and securities systems

Payment systems oversight forms an integral part of the Bank of France's statutory tasks. It performs its duty of ensuring "the smooth operation and the security of payment systems within the framework of the tasks of the European System of Central Banks (ESCB) relating to the promotion of the smooth operation of payment systems" through the provision of settlement services, the definition of recommendations and supportive action aimed at facilitating private sector initiatives contributing to a safe and efficient functioning of payment systems.

Pursuant to Article L 141-4 of the CoMF, the statutory competence of the Bank of France in the field of payment systems oversight also explicitly covers SSSs and CCPs. Well-designed and efficient SCSSs are important for the stability of the financial system since weaknesses in SCSSs can be a source of systemic disturbances to securities markets and to other payment and settlement systems.

The oversight of payment systems and SCSSs is three-tiered: defining the principles or standards underpinning their conception and operation, monitoring their implementation and, lastly, overseeing the actual conditions of operation and use. Consequently:

- the Bank of France participates actively in the definition of new international and European standards (CPSS/IOSCO working group, G10 central banks committee and ESCB/CESR task force);
- the Bank of France regularly assesses the systems according to the standards in force. In addition, the central bank periodically meets the managers of the systems in order to consider possible operational problems and to assess the envisaged evolutions;
- the Bank of France can defend its views regarding the orientations suggested by systems operators and concerning changes in the functioning rules. In case of necessity it may oppose these orientations or changes if they do not comply with the standards and principles. In a number of cases, the Bank of France may also decide to carry out audits;
- in order to monitor the functioning of large-value payment systems, the Bank of France has set up a statistical observatory, which among other things monitors the behaviour of participants in these systems, and a simulation tool. The operation of these systems and the interactions between them have been modelled and replicated using the simulation tool, which analyses changes in the behavioural patterns of participants, such as variations in the supply of liquidity or changes in optimisation mechanisms;
- in case of operational problems, the Bank of France is immediately informed of developments, and jointly defines with the managers of the systems and major market participants the measures necessary to avoid a spillover effect.

The integration of financial markets and infrastructures in the securities field in the euro area has led the monitoring authorities of the countries concerned to implement joint supervision of these activities.

In January 2001, the relevant authorities of Belgium, France and the Netherlands adopted a Memorandum of Understanding relative to the joint implementation of their respective responsibilities in terms of oversight, regulation and supervision of the Euronext Group. The first part of this document, signed for France by the Commission des Opérations de Bourse (COB) - the French Stock Exchange Commission - and the CMF, organises the coordinated regulation of the securities and derivatives transactions of the Euronext Group. The second part of this Memorandum of Understanding, signed on behalf of France by the CMF, the Commission Bancaire (CB) - Banking Commission - and the Bank of France, addresses the coordination of Euronext's clearing activities oversight, regulation and supervision; these activities are undertaken by the clearing house and central counterparty Clearnet.

Another Memorandum of Understanding was signed on 22 October 2001 by the Belgian and French authorities (the Belgian National Bank and the Financial and Banking Commission for Belgium; the Bank of France and the CMF for France) in order to organise the prudential supervision of the

Euroclear Group's current membership (Euroclear Bank-Euroclear France) and the oversight of its securities settlement systems.

A third Memorandum of Understanding with the Belgian and Dutch authorities was signed by the Financial Markets Council and the Bank of France on behalf of France in 2002. It organises cooperation for prudential supervision and oversight of the securities settlement services provided by Euroclear Bank for trades on Euronext markets.

This coordination involves monthly meetings between the relevant authorities.

1.2.2 Payment media

The ability of economic agents to effect payments efficiently is a condition for economic development. Therefore, large-scale use of payment media requires public confidence. This concern has come to the fore in recent years with the huge growth in the use of information technologies in this field. The dematerialisation of payment media, now well established in France, allows cost cutting and fosters shorter and more reliable processes. In the meanwhile, the security of payment media relies increasingly on their IT environment. The legal framework for the Bank of France's oversight mission on the security of payment media has been significantly strengthened by the Everyday Security Act.

According to its new statutory powers in security matters, the Bank of France is entitled to monitor the security level of the different payment media and to make recommendations about it. To fulfil its mission, the Bank of France considers that the security of payment media is based on the following three elements which are all relevant for its oversight role:

- the soundness of the issuer, which faces risks that may threaten its stability and could lead to systemic effects while undermining public confidence in the means of payment;
- the stability of agreements between all the parties involved in payment relationships. These agreements are essential for the protection of users against several kinds of risks, such as financial losses, non-execution of the transaction on the agreed conditions and fraud;
- the technical and organisational security dedicated to the protection of payment media against all types of threats. For each means of payment, the Bank of France analyses possible threats to its security, defines the minimum security objectives to which it must conform, and monitors that the resources implemented are adequate to meet the foregoing minimum objectives.

As an example, strong competition between credit institutions in the area of electronic purses, where security is an important issue, prompted the Bank of France to encourage market players to formalise minimum functional security requirements (or a "protection profile") for these products. This exercise involved IT security experts from the banking and smart card industries. All electronic purse providers in France have commissioned assessments against the above-mentioned minimum functional security requirements for the trial and potential rollout phases.

Such monitoring implies close relationship with industry representatives. In addition, the law allows the Bank of France to conduct expert analyses and ask the issuer or any interested party for all relevant information concerning payment media and the terminals or technical facilities associated therewith. If it deems that any such means of payment is insufficiently secure, it may recommend that the issuer take all necessary measures to remedy such insufficiency. If its recommendations are to no avail, it may, after having solicited the observations of the issuer, hand down a negative opinion published in the French Official Journal.

1.2.3 Prevention of fraud

The role of the Bank of France as a service provider in the field of payment instruments relates to its responsibilities regarding two national registers that help to ensure the security of card and cheque payments.

As part of the prevention system established by Act 91-1382 of 30 December 1991 on cheque and payment card security, the Central Cheque Register (Fichier Central des Chèques - FCC) stores centralised information on cheque payment incidents and the resulting bank-imposed and court-ordered cheque-writing bans. Pursuant to an agreement, the Register keeps a central record of bank card confiscations by institutions belonging to the Bank Card Consortium (Groupement Cartes

Bancaires - GCB). Access to this Register is restricted to credit institutions prior to the issuing of a cheque book, though they are also able to consult it before granting a loan.

The above-mentioned Act also states that anyone who receives a cheque in payment is entitled to obtain information from the Bank of France as to whether the cheque is regular. In order to provide this service, the Bank of France keeps a central record in the National Register of Irregular Cheques (Fichier National des Chèques Irréguliers - FNCI) of all incidents affecting the regularity of cheques drawn on a bank account. These may include loss or theft of cheque books, account closures and details of all accounts held by individuals or firms that have been banned from writing cheques. As authorised by a Decree of the Minister of the Economy and Finance dated 24 July 1992, the Bank of France has delegated responsibility for implementing the procedures for consultation of the Register, especially by retailers, to a company called Mantis. This company provides a service allowing access to the Register operating under the name RESIST.

1.3 Role of other private and public sector bodies

1.3.1 Financial intermediaries allowed to provide payment services

Following the merger and consolidation process within the financial sector, there were 1,037 credit institutions conducting their business in France at the end of 2001, versus 1,608 in 1994. Of these, 249 were commercial banks licensed as all-purpose institutions to conduct a very wide range of activities; 167 were cooperative banks, savings banks or municipal banks; 521 were finance companies (sociétés financières), which are not allowed to take deposits from the public for less than two years and the activities of which are restricted in accordance with their status; 17 were specialised financial institutions (Institutions Financières Spécialisées) entrusted by law with a permanent public interest mission (and unable to engage in banking operations other than those pertaining to that mission). Finally, there were 55 branches of credit institutions incorporated in the EEA and 28 branches of credit institutions incorporated in third countries.

The number of domestic branches of all credit institutions totalled 26,049 at the end of 2001.

The Post Office's financial arm plays a significant role in the French financial system as it holds a proportion of sight accounts, most of which are held on the books of the Postal Cheque Centres (Centres de Chèques Postaux - CCPs), and time accounts, held with the National Savings Bank.

The Treasury's receiving and paying officers used to manage bank accounts for private individuals (around 0.8 million) and carry out a number of banking operations. However, the Treasury stopped this activity at the end of 2001, and now holds public bodies' accounts only.

1.3.2 Representative bodies

Credit institutions and investment firms are collectively represented in their relations with the public authorities through a two-tier system:

- institutions that are not members of banking networks must belong to a professional association, such as the French Banking Federation (Fédération Bancaire Française - FBF) for banks,² the Finance Companies Association (Association des Sociétés Financières - ASF) for finance companies and the French Investment Firms Association (Association Française des Entreprises d'Investissement - AFEI) for investment firms; and
- the central bodies of the banking networks and professional associations mentioned above are affiliated to the French Association of Credit Institutions and Investment Firms (Association Française des Etablissements de Crédit et des Entreprises d'Investissement - AFECEI), which represents all credit institutions and investment firms, provides information to its members and to the public, studies all issues of common interest and prepares relevant recommendations.

² In addition to banks, four central bodies of banking networks have joined the FBF.

1.3.3 Regulatory and supervisory authorities

The Banking and Financial Regulations Committee (Comité de la Réglementation Bancaire et Financière - CRBF) issues general regulations and rules applicable to credit institutions and investment service providers.

The Credit Institutions and Investment Firms Committee (Comité des Établissements de Crédit et des Entreprises d'Investissement - CECEI) is in charge of making all individual decisions concerning credit institutions and investment firms, in particular decisions concerning licences.

The Banking Commission (Commission Bancaire - CB), which is chaired by the Governor of the Bank of France, is responsible for supervising credit institutions and investment firms.

Other authorities such as the Financial Markets Council (Conseil des Marchés Financiers - CMF) and the French Stock Exchange Commission (Commission des opérations de Bourse - COB) have responsibilities regarding regulated markets and the establishment and monitoring of compliance with rules related to the provision of investment services and to securities markets.

1.3.4 Other entities

The National Credit and Securities Council (Conseil National du Crédit et du Titre - CNCT) conducts studies regarding the conditions under which the banking and financial system operates. The CNCT is also a forum for wide-ranging consultation among the representatives of all parties involved in France's economic and financial sphere.

Several entities have been established to study, discuss and coordinate the evolution of the payment systems infrastructure, both in general and in banking terms, as well as in terms of technical change and standardisation.

The French Committee for Banking Organisation and Standardisation (Comité Français d'Organisation et de Normalisation Bancaires - CFONB) is the French banking standard-setting body and a forum for studying the modernisation of banking organisation.

A number of economic interest groupings (Groupements d'Intérêts Economiques - GIE) also intervene in the field of payment systems, in particular the SWIFT Users Group in France (Groupement des Utilisateurs SWIFT en France - GUF), the Interbank automated clearing group (Groupement pour un système interbancaire de télécompensation - GSIT) and the GCB (see Section 2).

The Centre for Interbank Funds Transfers (Centrale des Règlements Interbancaires - CRI), which is currently owned by 10 credit institutions and the Bank of France, plays three different roles: its first purpose is to act as a forum for studying issues in the field of large-value payment systems; it is also the operator of the single platform carrying SWIFT messages for both TBF and PNS; and lastly, it owns and operates the PNS system (see Section 3).

2. Payment media used by non-banks

2.1 Cash payments

Both French banknotes and coins were legal tender until 17 February 2002. Euro coins were delivered to the public from 14 December 2001 but were not legal tender before 1 January 2002. Euro banknotes were delivered to the public from 1 January 2002. There are seven denominations of euro banknotes (5, 10, 20, 50, 100, 200 and 500) and eight denominations of euro coins (1, 2, 5, 10, 20 and 50 cents, and EUR 1 and EUR 2) in circulation.

French banknotes and coins were exchangeable at all banks until 30 June 2002. Coins will be exchangeable until 17 February 2005 and banknotes until 17 February 2012 at the Bank of France, the Treasury or the IEDOM.

Cash in circulation accounted for 8.3% of the monetary aggregate M1 and 2.4% of GDP at the end of 2001.

2.2 Non-cash payments

2.2.1 Credit transfers

With 1.6 billion operations exchanged in French payment systems in 2001, averaging a value of EUR 59,200 each, retail credit transfers rank third behind cheques and card payments in terms of the number of transactions. They accounted for around 16% of exchanges of bank and postal transfers.

This instrument is used for payments made by companies, government agencies and local authorities, but seldom by individuals.

The interbank exchange of all credit transfers takes place in paperless form. Ordinary transfers are settled on the day of presentation, while credit transfers for payment on a due date (which remain rare) are presented two or three days in advance of interbank settlement.

Various types of automated transfers meet specific needs. Referenced credit transfers (Virement Référéncé - VR) are initiated through a home banking service in settlement of an invoice and contain all the references of the creditor. Credit transfers from abroad (Virement d'Origine Extérieure - VOE) enable a bank established in France to send a transfer received from abroad via SIT to the payee's bank, along with the information needed by the payee, such as the exchange rate applied and the commission charged. Lastly, credit transfers by electronic data interchange (Virement Echange de Données Informatisées - VEDI) contain message references in EDIFACT format.

2.2.2 Cheques

The cheque is still the most widely used payment instrument in France. Approximately 3.61 billion cheques, with an average value of EUR 508, were exchanged in payment systems in 2001, representing 37% of total exchanges. However, the relative share of cheques in cashless payments has continued to decline steadily since 1993.

Cheques are still popular because customers consider them easy to use, either for remote payments or face-to-face transactions, and they are free of charge for the drawer.

2.2.3 Direct debits

Since their introduction in 1967, direct debits have been very successful: over 1.37 billion such transactions were exchanged in French payment systems in 2001, with an average value of EUR 238. They are generally used for recurrent payments such as electricity, gas, telephone and water bill payments, and for monthly tax payments. Direct debits offer advantages to banks (processing costs are relatively low thanks to automation), as well as to the utility companies (by simplifying their accounting administration) and to individuals (by simplifying the payment).

Initiators of direct debits require approval from a bank. They must also obtain a signed authorisation from the payer, which is then sent to the payer's bank. Before transmitting the direct debit order to its bank for collection, the initiator must notify the payer of the amount and date of the debit (by sending an invoice, for example) to enable the latter to make sure there are sufficient funds on its account or to contest the order if it so wishes.

Use of the interbank payment order (Titre Interbancaire de Paiement - TIP) has grown steadily since its introduction in 1988. It now represents 130 million operations per year, with an average value of EUR 316 in 2001. A TIP works in the same way as a direct debit, except the payer is required to assent to each payment by signing the TIP form which is sent with the corresponding invoice.

The TIP allows creditors to rationalise and optimise the collection of receivables and banks are able to process them automatically at one of the 13 centres approved by the CFONB before they are exchanged via SIT. The TIP is expected to gradually replace most recurrent remote payments made by cheque.

2.2.4 Card payments

Debit cards

Bank cards are mostly debit cards, which can be used to execute both payments and cash withdrawals through a nationwide network of POS terminals and ATMs.

Debit card payments ranked second behind cheques in terms of number of transactions in 2001, with 3 billion operations exchanged and an average value of EUR 46.

The cards issued by credit institutions have to meet the technical and security standards set by the Bank Card Consortium (Groupement Cartes Bancaires - GCB), the association of the main French banks which manages the domestic debit card system. The interoperability of bank cards facilitated by these standards has been the main driving force behind the development of debit cards in France.

There were 43.3 million interbank cards (cartes bancaires) in circulation at end-2001. Approximately 26 million of these also allow payment to be made abroad (to merchants affiliated to either Visa or Eurocard/MasterCard).

For several years, cards have been systematically equipped with a microprocessor, resulting in an exceptionally low level of card fraud (0.026% of the value of transactions in 2001).

A specific network, the Bank Card Network (Réseau Cartes Bancaires - RCB), is used for the transmission of authorisations for withdrawals and payments. This network enables an ATM or a POS terminal to obtain authorisation from the bank that has issued the card. This authorisation also means that the payment is guaranteed for the beneficiary.

Card transactions have been processed through SIT (see Section 4) since the second half of 1995.

Credit cards, travel and entertainment cards

In previous years, these cards were only issued by bodies which did not, in principle, take deposits, but which were required to have a credit institution status in France in accordance with the legal framework. Recently, deposit banks have started to issue credit cards, in addition to debit cards. The main issuers are Cetelem, subsidiary of BNP Paribas ("carte Aurore", 9 million users in France), Cofinoga, Finaref (about 8 million cards issued), Cofidis (4 million cards), Accord (1.5 million cards), and Pass (2 million cards). American Express has issued 500,000 travel and entertainment cards in France.

Retailer cards

An estimated 20 million cards are issued by retailers or service providers in order to secure customer loyalty and, in some cases, grant credit facilities. The credit is repaid by debiting the customer's bank account. However, once such cards are used to obtain credit, or whenever they can be used at outlets other than the issuer's own, the card must be issued by a credit institution, even though the retailer's name generally features prominently on the card.

ATM and POS networks

At the end of 2001, 32,500 ATMs had been installed nationwide. In addition to these, there were 750,000 POS terminals in operation. Both ATMs and POS terminals are interoperable.

2.2.5 Postal instruments

Postal instruments are identical to the instruments used by the banks, except for the postal cheque, which can also be used as a postal giro.

2.2.6 Other payment instruments

Bills of exchange now play a relatively limited role, with companies using credit transfers. Approximately 114 million transactions involving other payment instruments were exchanged in 2001, with an average value of EUR 3,961.

2.3 Recent developments

2.3.1 *Electronic money*

Three banking consortia were created at the end of the 1990s, each of them promoting competing electronic purses with a specific technology and different market approach. At the end of 2001, Moneo, Modeus and Mondex were still in use.

Société Européenne de Monnaie électronique (SEME), which promoted Moneo, and the bankers of Modeus announced the merger of their organisations in July 2000. The new company BMS (Billétique Monétique Services) is the result of the convergence of the two projects and brings together the main credit institutions, transport companies and some technological firms.

After its successful launch in Tours in 1999, Moneo was introduced in the Department of Finistère in November 2000 and in Montpellier, Poitiers, Bordeaux and Lyon in the first half of 2001. In December 2001, more than 318,000 electronic purses were in use, and two and a half transactions per purse per month were performed for an average amount of EUR 3.65. Moneo is based on the GeldKarte technology as a result of the ongoing partnership of GCB and its German counterpart ZKA (Zentraler Kreditausschuss) in the field of interoperable electronic purses. However, Moneo has some specific features, including an offline loading facility at POS terminals that ensures that the cardholder never runs out of electronic cash. Moneo is typically a mixed card containing the traditional chip-based French debit card along with the electronic purse; both payment instruments are used in their respective domains (Moneo for low amounts and the debit card for all other amounts).

In a parallel way, the second project, Modeus, couples a contactless transport ticketing application with an electronic purse, with a view to testing the coexistence of these two services on the same smartcard. This brings both better ergonomics and strong constraints in terms of transaction times and security. The pilot has been launched in a major railway and metro station in Paris. The targeted customers are mass transportation users, of which only 50% are bank cardholders.

Crédit Mutuel has created a special purpose company called MONDEX France to buy and operate the licence for the MONDEX International technology for the French territory and the euro. The MONDEX system has the following features: a single issuer provides electronic value to members who distribute and acquire it; purse-to-purse transfers are technically feasible between all actors regardless of their status (customers, merchants, banks). In the French scheme, a fraud detection module based on the activity of individual purses will be added to the basic management system of MXI and purse-to-purse transfers will be limited to customers within the same family. The pilot phase was launched in Strasbourg in 1999.

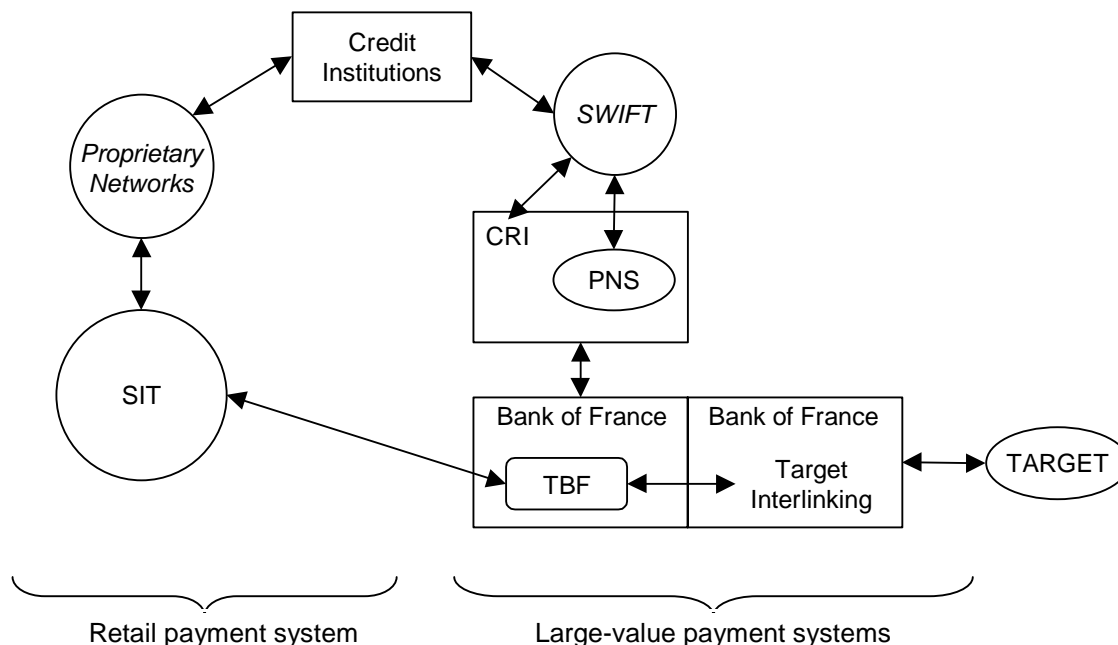
All 11 banks participating in these two consortia (BMS and MONDEX) are committed to the convergence or the interoperability of the schemes after the trials and have agreed upon a single electronic money issuer, a special purpose credit institution called Société Financière du Portemonnaie Électronique Interbancaire (SFPMEI). The role of the SFPMEI, which was licensed as a credit institution in September 1999, is to issue electronic money and collect as well as manage the funds received as a counterpart of the issuing process. The SFPMEI also defines security requirements (technical and organisational) for the schemes and makes sure that they comply with these requirements on an ongoing basis. It guarantees to all e-money holders the redemption of their electronic value.

With this sole issuance structure, the banks reduce costs and also share the necessary security expertise, while competing on tariff structures and service packages.

3. Interbank exchange and settlement systems

3.1 General overview

The current structure of the French payment systems (excluding SSSs) consists of one retail payment system and two large-value payment systems.



There is one single retail system operating in France: the French automated clearing house, SIT. It is managed and operated by the GSIT, a group of 17 participants (including the Bank of France).

Large-value operations are processed in two systems:

- the RTGS system *Transferts Banque de France (TBF)*, which is the French component of *TARGET*, managed and operated by the Bank of France; and
- the hybrid system *Paris Net Settlement (PNS)*, managed and operated by the *Centrale des règlements interbancaires (CRI)*, an interbank body owned by 10 banks and the central bank.

In *TBF* and *PNS*, settlement takes place operation by operation, while in *SIT*, the balances resulting from a business day's operations are settled on a net basis through the accounts held by participants in *TBF*.

3.2 The French real-time gross settlement system, *Transferts Banque de France*

The French RTGS system, *TBF*, started operating in French francs on 27 October 1997 and switched to the euro at the launch of *TARGET* on 4 January 1999. The Bank of France manages the account relationship with *TBF* participants and the operation of the *TBF* system, while the *CRI* ensures the routing and validation of payment and information messages exchanged within the system.

3.2.1 Operating rules

Like the other RTGS systems connected to *TARGET*, *TBF* complies with the minimum common features set forth in the *TARGET* Guideline.

Additional rules related to the service level, accounting structure, liquidity provision, pricing policy and the respective liabilities of participants and the Bank of France as system operator are set forth in the agreement signed by each *TBF* participant.

3.2.2 Participation in the system

The TBF system is open to:

- credit institutions incorporated or established in France;
- institutions governed by Article L 518-1 of the CoMF (public sector financial institutions);
- investment firms incorporated or established in France, provided they are licensed for an activity requiring direct access to a RTGS system and authorised to be a custodian on behalf of customers;
- credit institutions incorporated in an EEA country and benefiting from the European passport;
- investment firms incorporated in an EEA country and benefiting from the European passport, provided they are licensed for an activity requiring direct access to an RTGS system; and
- branches established in an EEA country of credit institutions incorporated in third countries.

At the end of 2001, 192 institutions were participating in TBF on a direct access basis.

Foreign participants have to provide a legal opinion and all participants have to sign an agreement with the Bank of France. This agreement sets out the rules governing the relationship between the holder of a TBF settlement account and the Bank of France.

Furthermore, each settlement account belongs to a group of accounts, which may consist of a single or several settlement accounts. The balance on a group of accounts must always be positive. Hence, negative balances on a participant's settlement account must be guaranteed by positive balances on other settlement accounts belonging to the same group of accounts. The grouping of settlement accounts is left up to the participants, within the framework of the following rules:

- a participant must hold all its settlement accounts within one single group of accounts; and
- within a group of accounts, all settlement accounts must be held by entities belonging to the same banking group.

The constitution of a group of accounts is subject to a formal agreement between the Bank of France, the holder of the group of accounts and the holders of all settlement accounts within this group of accounts.

Finally, an applicant's technical ability to operate in the system must be positively assessed by the CRI against a set of specific criteria, such as the ability to send correctly formatted payment messages and information requests, the existence of a database recording all operations and the ability to fall back on a remote backup site in case of an incident on the primary site.

A participant may leave the system with 40 days' notice. Furthermore, the Bank of France may exclude a participant from the system without notice if it no longer meets statutory criteria, or if its financial situation or behaviour is deemed to jeopardise the system's security and efficiency.

3.2.3 Types of transactions handled

The use of TBF is mandatory for the settlement of monetary policy transactions and for the settlement of balances of ancillary systems (the RGV2 SSS, the PNS large-value hybrid system, Clearnet margins and deposits, SIT). It is also used for domestic and cross-border interbank and customer operations. As the PNS system and the SSS RGV function in real time and in central bank money, TBF also handles real-time liquidity transfers to and from these systems.

Interbank and customer payments can only be originated by the holder of the debited account, with the exception of the Bank of France, which can originate operations by debiting other participants. Payments may not be cancelled once transmitted to the system, but the holder of the credited account may transfer them back once settled on the basis of a cancellation request.

TBF participants can issue time-designated payments by specifying the time of day at which they want their payment to be checked for settlement.

3.2.4 Operation of the system

TBF is open every day except Saturday, Sunday and TARGET closing days. Its operating hours are from 7 am to 6 pm CET.

3.2.5 Transaction processing environment

TBF uses the SWIFT network and message formats (MT 202 for interbank payments and MT 100, 103 and 103+ for customer payments).

SWIFT class 9 message types are also used to convey information and requests concerning account balances, the announcement of central bank operations and settlement of ancillary systems, and system management (eg start and end of the day, incident on a TARGET component).

Payment messages are processed using a Y-shaped message flow structure. When a participant issues a TBF payment message, SWIFT forwards an extract of the payment message to the CRI technical platform, which transmits it to TBF. After checking the extract against settlement criteria, TBF sends back a notification that bears one of the following status readings: executed, queued or rejected. This notification is forwarded to both sending and receiving participants; simultaneously, the original payment message is sent to the receiver, if executed, or returned to the sender, if rejected.

TBF's processing functions and data are replicated on a remote site for business continuity purposes.

3.2.6 Settlement procedures

Standard settlement

As in other RTGS systems, TBF payments are processed one by one on a continuous basis. Payments are settled with immediate finality in central bank money provided that they meet the following settlement criteria:

- the balance on the group of accounts to which the debited settlement account belongs must exceed the amount of the payment;
- a standard priority payment can settle only if there is no payment in the outgoing high priority queue of the group of accounts; and
- a new standard priority (or high priority) payment can settle immediately only if the standard priority (or high priority) queue of the group of accounts is empty.

Payments that do not meet one of these criteria are queued and subject to further settlement attempts. TBF manages two queues:

- a high priority queue for monetary policy operations, settlement of ancillary systems, cancellation requests and payments related to CLS pay-ins; and
- a standard priority queue for other transfers.

When a payment is credited to a participant's account, the system attempts to settle payments queued in its group of accounts, according to its balance and on a FIFO basis within each priority level.

Time-designated payments are processed in the same way as other payments, but they are tested against settlement criteria at the time specified by the sender and not immediately after issuance. Account balances and queues are considered at the level of groups of accounts. A participant's balance is the net sum of the balances on all the settlement accounts belonging to the same group of accounts and its queue consists of payments sent by it and other participants belonging to the same group that have not been settled. Participants can transfer funds freely from one settlement account to another within the same group of accounts, regardless of this group of accounts' balance and queues.

TARGET Interlinking payments

Outgoing TARGET payments are processed in two stages. They are first processed like standard domestic payments: if the settlement criteria are met, TBF debits the sending bank's account and credits a specific settlement account (the Bank of France holds one settlement account per country connected to TARGET). Once this payment is executed, the Bank of France's TARGET platform issues a settlement request to the national central bank (NCB) holding the beneficiary account, using

the standard Interlinking procedures. Concerning incoming cross-border payments, once the Bank of France's TARGET platform receives the settlement request from the sender NCB, the Bank of France's settlement account for this NCB is debited and the beneficiary bank's account is credited.

Settlement of ancillary systems

The settlement cycle for ancillary systems begins with a confirmation period so that participants have time to check the balances announced by the ancillary system and, if necessary, raise the funds needed to cover their debits. In the event that a participant does not agree with its balance, the ancillary system manager must investigate and, should an agreement not be found by the end of the confirmation period, the balances arising from the ancillary system must be reissued to TBF as soon as possible after reconciliation.

Then, settlement occurs either independently for each participant if all balances are held vis-à-vis a central counterparty (in practice, this pattern applies only to the settlement of margins in Clearnet and the payment of fees by Euronext participants), or on an "all or nothing" basis if each participant's balance is the sum of its debits and credits vis-à-vis all the other participants in the system. In the latter case, the settlement routine checks that all negative balances in the ancillary system can settle simultaneously according to the settlement criteria. If this is not the case, the whole system is queued and is subject to further settlement attempts during its settlement period.

Optimisation mechanisms

TBF runs two optimisation mechanisms:

- Global optimisation: when a payment is queued, the system computes a virtual balance for each group of accounts, which is the sum of the actual balance and incoming/outgoing queued payments for this group of accounts. If all virtual balances are positive, all queued payments are settled. Otherwise the system makes the same attempt, but considering only "high priority" virtual balances (sum of actual balance and incoming/outgoing high priority queued payments); if these virtual balances are all positive, all high priority payments are settled.
- Simulation of ancillary systems: this process is launched every 210 seconds when there are one or several multilateral ancillary systems pending in queues. For each group of accounts, the system computes a virtual amount of liquidity, which is the sum of the actual balance and positive balances in queued ancillary systems. The system then scans through the outgoing queues of each group of accounts and checks which operations could be settled with the virtual liquidity. This process is iterative because the operations whose settlement is simulated are credited to other groups of accounts, which in turn allows the simulated settlement of operations pending in their queues. If there is no other ancillary system pending in queues at the end of the process, all simulated operations are settled, otherwise balances and queues return to their initial situation.

3.2.7 Credit and liquidity risk

As in other RTGS systems, TBF settlement occurs in central bank money and with immediate finality. The debiting of the sending bank's account and crediting of the receiving bank's account occur simultaneously, so that funds are available to the latter bank in an unconditional and irrevocable manner as soon as the payment is settled. Thus, participants are not exposed to credit and liquidity risks.

The provision of liquidity in TBF fully complies with the framework defined at the Eurosystem level, which aims at providing unlimited and free-of-charge collateralised credit to RTGS participants in order to ensure a smooth processing of payments. TBF participants can obtain liquidity either through intraday repos or by using intraday secured loans. This latter mechanism allows banks to obtain intraday credit in exchange for the transfer of good quality private claims to the Bank of France.

3.2.8 Pricing

The pricing for TBF consists of an annual fee and a transaction fee. The transaction fee is the same for all participants, regardless of the volumes they process through the system. The annual fee covers access to both TBF and PNS and depends on the number of settlement accounts held within the TBF

group of accounts to which the participant belongs. Furthermore, new participants in the system have to pay an entry fee.

3.2.9 Statistics

In 2001, a monthly average of 112,379 cross-border transfers and 204,399 domestic payments were issued in TBF. The daily transaction volumes amounted to 5,309 for the cross-border component and 9,657 for the domestic component, and the daily values EUR 75 billion and EUR 270 billion respectively. The historical peaks in volume are 8,554 cross-border payments and 26,834 domestic payments, and the highest turnovers EUR 161 billion and EUR 780 billion respectively.

3.3 The other French large-value payment system, Paris Net Settlement

Paris Net Settlement (PNS) went live on 19 April 1999 and replaced the *Système Net Protégé* (SNP), which had been operating since 1997. It is owned and managed by the CRI.

PNS, which settles in central bank money, can be defined as a hybrid settlement system as it offers netting mechanisms while transactions are settled in real time.

3.3.1 Operating rules

The PNS system is open every day except Saturday, Sunday and TARGET closing days. Its operating hours are from 8 am to 4 pm CET.

In order to feed liquidity in central bank money into the system, PNS participants are committed to making a transfer from their TBF settlement account to their position in PNS at the opening of the system. The minimum amount of this initial transfer is EUR 15 million.

At the system's close at 4 pm, payments still pending in queues are rejected and the balances of PNS participants are transferred to their TBF settlement accounts. Because PNS payments can only be settled if the debited participant's liquidity is sufficient, balances in PNS are structurally positive and the end-of-day settlement in TBF always results in credits to the participants' settlement accounts.

3.3.2 Participation in the system

PNS is open to the same categories of institutions as TBF. In 2001, 24 credit institutions were participating in PNS on a direct access basis.

Foreign participants have to provide a legal opinion and all participants must sign an agreement with the CRI and also with the Bank of France. The latter agreement governs the rules for the settlement account that a participant holds with the Bank of France in order to fund its PNS position with central bank money.

An applicant's technical ability to operate in the system must be positively assessed by the CRI against a set of specific criteria, such as the ability to send correctly formatted payment messages and information requests, the existence of a database recording all operations and the ability to fall back on a remote backup site in case of an incident on the primary site.

The withdrawal and exclusion of participants follow the same rules and criteria as for TBF.

3.3.3 Types of transactions handled

PNS is a credit transfer system, which means that payments can only be issued by the holder of the debited account. It processes customer and interbank payments, as well as liquidity transfers to and from TBF. The value of payments processed is not subject to upper or lower limits.

3.3.4 Transaction processing environment

PNS operates in an environment similar to that of TBF. It uses the SWIFT network and message formats and the Y-shaped message flow structure.

PNS has a real-time link with TBF to allow the processing of liquidity transfers between the two systems. A participant wishing to move liquidity from PNS to TBF must send a PNS payment to the

account that the Bank of France holds in the system to this effect; once settled, this payment automatically triggers a TBF transfer from the Bank of France's PNS settlement account to this participant. Conversely, a TBF-to-PNS transfer consists of two steps: a TBF payment from the participant to the Bank of France's PNS settlement account, which once settled triggers a PNS payment from the Bank of France to the participant.

PNS processing functions and data are replicated on a remote site for business continuity purposes.

3.3.5 Settlement procedures

PNS payments are processed one by one on a continuous basis. Each transaction meeting the following settlement criteria is settled immediately:

- the balance on the sender's account must exceed the amount of the payment;
- the balance of exchanges between sender and receiver must stay within the bilateral limit defined by the sender vis-à-vis the receiver; and
- there must be no other payment pending in the participant's queue.

In the event that these criteria are not fulfilled, the transaction is queued. Like TBF, PNS permanently scans queues: when a payment is credited to a participant's account, the system attempts to settle payments queued on its account, according to its balance and on a FIFO basis.

PNS runs two optimisation mechanisms:

- **Bilateral optimisation:** each time a payment from A to B is queued, the system scans queued payments from A to B and from B to A and attempts to settle them simultaneously on a FIFO basis and according to both participants' balances and bilateral limits.
- **Global optimisation:** this process is launched upon a decision by the CRI. First, all payments that would cause bilateral limits to be exceeded are virtually removed from the queues and transitory balances are computed (as the sum of real balances and queued payments that have not been virtually removed). Then, queued payments are virtually removed from the queue of the participant with the transitory balance that is the most negative, until it becomes positive. The same process is applied in an iterative way until all transitory balances are positive. Finally, all payments that have not been removed from the queue are settled and other payments are queued again in their previous order.

3.3.6 Risk management features

PNS's main feature in terms of risk mitigation is its scheme of irrevocable settlement in central bank money.

Furthermore, PNS offers two types of caps, both of which are fully under the control of the participants and enable them to control their liquidity and credit risks:

- **a multilateral cap:** by controlling the amount of liquidity fed into PNS via the real-time link with TBF, a participant can in practice set a multilateral limit, ie define the maximum amount it is ready to pay to its counterparties before receiving payments from them; and
- **a bilateral cap:** participants may set bilateral limits vis-à-vis each other. A bilateral limit set by A vis-à-vis B represents the maximum amount A is ready to pay to B before receiving money from the latter, and thus allows counterparty risk to be controlled. It also acts as a self-regulation mechanism, because participants do not have to wait until all operations due to them are settled before feeding liquidity into the system.

3.3.7 Pricing

The pricing principles are the same for PNS as for TBF, although the transaction fee differs between the two systems.

3.3.8 Statistics

In 2001, PNS processed a monthly average of 667,001 payments. The daily turnover was 31,512 payments with a value of EUR 88 billion. The maximum number of payments processed in one day is 54,341 and the highest daily value amounts to more than EUR 145 billion.

4. Retail payment systems

Since February 2002, the only retail payment system has been the French automated clearing house, *Système Interbancaire de Télécompensation* (SIT), which completed the last phase of its implementation with the integration of euro-denominated truncated cheques. All retail cashless payments are exchanged electronically through SIT. The regional centres for the exchange of truncated cheques (*Centres Régionaux d'Echange d'Image-Chèques*) (CREICs) and the 102 clearing houses located outside Paris closed down in March 2002. The Paris clearing house closed at the end of the first half of 2002.

4.1 The French automated clearing house, SIT

The *Système Interbancaire de Télécompensation* (SIT) is designed to allow the exchange of all electronic retail payment instruments. The system is a remote transmission network providing direct bilateral links between direct participants' computing centres under the supervision of joint centres.

The system is operated by an interbank automated clearing group called the GSIT formed in June 1983. The Bank of France is a member of the GSIT and its decision-making and research bodies.

Almost seven billion transactions were processed by SIT in 2001, totalling EUR 2.44 billion.

4.1.1 Operating rules

The operations of the system are ruled by an interbank agreement governing the exchange conditions (*Charte Interbancaire Régissant les Conditions d'Echange - CIRCE*) which is binding for all the participants.

SIT consists of a network of computers, called stations, located on each participant's premises. Stations must be approved by the GSIT and are dedicated to SIT when connected to the network. Eighty stations were connected at the end of 2001.

During the working day, all direct participants are committed to receiving the interbank operations addressed to them. Direct participants are financially liable for their own operations and those of the institutions they represent. They have to comply with minimum volume requirements set by the Board of the GSIT.

A management centre continuously monitors the smooth operation of SIT and the traffic flow. This centre also monitors security, detecting incidents and automatically rerouting transactions.

An accounting centre keeps transaction records up to date, supplying the requisite data for daily clearing. It transmits the netted multilateral balances to TBF for settlement.

4.1.2 Participation

All banks sending or receiving payments eligible for SIT must participate in the system as either direct or indirect participants:

- direct participants must send and receive, for their own account, a certain percentage of the volume exchanged annually via SIT. The responsibilities of direct participants are both financial and technical and extend to the institutions they represent. There were 17 direct participants at the end of 2001; and
- indirect participants (689 at the end of 2001) send and receive payments via a direct participant.

4.1.3 Types of transactions handled

SIT has been handling all retail payments between banks including cheques since June 2001 (ie credit transfers, cheques, direct debits and card payments and withdrawals, bills of exchange).

4.1.4 Operation of the system

SIT operates 21 hours a day from Monday to Saturday. SIT working days start at midnight and end at 9 pm. The cutoff time for same-day settlement is 2.30 pm for exchanges up to 1.30 pm. For payments sent after the cutoff, balances are transferred to the next day.

The acknowledgement of payment transactions between a sending and a receiving credit institution automatically triggers the transmission of an accounting message from the sending party to the SIT accounting centre, which calculates daily clearing balances to be forwarded to the Bank of France for settlement in TBF.

4.1.5 Technical environment

Each direct participant has one or more processing centres, where a dedicated station serves as an access point to SIT. The stations are connected to all of the joint centres (administration, accounting and backup). Each station comprises two kinds of logical units, the SI (Sending Installation) and the RI (Receiving Installation), which communicate with those of SIT and the other participants.

The SIT joint centres, which provide full backup, perform the following specific functions: monitoring the network, controlling the flow of operations, maintaining software consistency and security, accounting and computing balances, and providing the final backup for receiving institutions. The network is designed to support 250 stations. Data are transferred via the TRANSPAC public packet-switching network (gradually evolving to an IP network since mid-2002).

4.1.6 Settlement procedures

SIT balances are calculated after the cutoff (2.30 pm) and net balances for debiting and crediting to the accounts of direct participants are then transmitted to the CRI to be settled in TBF at 3.15 pm.

4.1.7 Pricing

The pricing of the system is based on fixed fees according to the type of membership (direct or indirect) and the number of gateways and stations, and variable fees according to the number and type of operations exchanged (number of operations and groups of operations).

4.1.8 Credit and liquidity risk management

At present, SIT has an unwinding rule in the event of the failure of a direct participant. A guarantee fund is under consideration. The exchanges of indirect participants are guaranteed by their direct participants.

4.2 Exchange of truncated cheques

Banks decided that, from 2002, all cheques in euros would be truncated and exchanged through SIT, resulting in an increase in the volume of operations and an improvement of cheque process.

4.2.1 Objectives

Exchange of truncated cheques is the last step of the payment instrument modernisation in France, and consequently all retail payment instruments are currently handled electronically through SIT. The main objective is the reduction of processing costs for both banks and customers (procedure simplification, delay improvement).

4.2.2 Operating rules

The rules are agreed upon by the banking community and are described in a pro forma agreement.

Remitter banks are committed to conducting the following operations:

- verifying that the cheque complies with legislation concerning cheques and regulations on banking practice;
- ensuring the accuracy of the information transmitted;
- storing the cheque or an exact copy thereof; and
- providing on request a copy for 10 years following the exchange date.

In addition, a proportion of the cheques has to be physically circulated for verification by the debited banks: those whose amount is above EUR 5,000, those that are non-standardised or considered suspicious by the remitter bank, and others randomly selected.

5. Securities settlement systems

5.1 Trading

5.1.1 Institutional aspects

5.1.1.1 General legal aspects

Euronext Paris, which has the status of a specialised financial institution under French law, manages the French stock exchange by:

- designing market member admission rules and admitting market members;
- designing listing rules and admitting securities and derivatives to listing;
- designing market rules;
- managing the electronic trading platform;
- computing and publishing market data.

5.1.1.2 Recent evolution of Euronext

On 22 September 2000, shareholders of the Amsterdam Exchange, Brussels Exchange and ParisBourse^{SBF} SA received shares in the new holding company Euronext NV, in exchange for their existing interests. However, in order to meet regulatory requirements, the three market operators, all now wholly owned subsidiaries of Euronext NV, retained a separate identity under the new names Euronext Amsterdam NV, Euronext Brussels SA/NV and Euronext Paris SA.

5.1.1.3 Supervision and regulation

All the rules designed by Euronext Paris SA are subject to the approval of the regulating authority, the CMF.

National regulators currently supervise the national entities that come under Euronext NV. However, in order to supervise a cross-border exchange like Euronext, the national regulators, namely the COB and CMF in France, the Commission Bancaire et Financière (Banking and Finance Commission) in Belgium and the Authority of Financial Markets of the Netherlands signed a memorandum of understanding on 26 January 2001, detailing the cooperation framework for the supervision of Euronext.

5.1.1.4 Access criteria

In order to become a market member of Euronext Paris, intermediaries must fulfil two conditions: being duly authorised by the French regulatory authorities to offer investment services and complying with Euronext admission rules.

Since the Modernisation of Financial Activities Act dated 2 July 1996 (enforcing the Investment Services Directive), investment services can be offered by:

- investment services intermediaries authorised by the CECEI whose programmes of operations have been approved by the CMF;
- legal entities whose principals and members are intermediaries authorised to offer such investment services, on condition that such principals and members have unlimited liability for all debts and obligations of the legal entity;
- European intermediaries authorised by their home member state to offer such services; and
- legal entities authorised by the CMF to trade for own account or offer trading for third parties.

To set up a single pan-European stock exchange, Euronext is currently adopting common rules especially in the following areas: market member admission rules, listing rules and market rules.

Once a member, the intermediary has access to the French stock markets.

5.1.2 Operational aspects

5.1.2.1 Markets

Euronext Paris SA manages four regulated markets within the meaning of the Investment Services Directive :

- two cash markets: La Bourse de Paris (Premier Marché, Second Marché and Marché des EDR) and le Nouveau Marché; and
- two derivatives markets: MATIF and MONEP.

In addition, Euronext Paris SA manages an organised cash market dedicated to the trading of non-officially listed securities: the “Marché Libre” OTC.

The cash markets

Euronext Paris SA manages four cash markets, whose characteristics are described in the following table.

In addition to shares, the cash regulated markets offer special market segments for the trading of public and private bonds, securitisation funds, warrants, index certificates, European depository receipts (since 1999) and exchange-traded funds (“NextTrack” segment launched in January 2001).

	Regulated markets			Organised market
	Premier marché	Second marché	Nouveau marché	Marché libre OTC
Listed company profile	Largest French and foreign companies (market capitalisation around EUR 1bn/ 25% of capital offered to the public/3-year track record)	Medium-sized French and foreign companies (10% of capital must be offered to the public)	High-growth companies (20% of capital offered to the public, at least 100,000 shares and EUR 5m value offered to the public, minimum capital funds of EUR 1.5m) through capital increase for half at least	Companies not traded on a regulated market
Trading rules	Central Order Book: Continuous trading/fixing Block trading procedures after trading hours	Central Order Book: Continuous trading/fixing Block trading procedures after trading hours	Central Order Book: Continuous trading/fixing Block trading procedures after trading hours	Fixing
Trading platform	NSC	NSC	NSC	NSC
Trading hours	Continuous trading: Pre-opening: 07:15-09:00 Session: 09:00-17:25 Pre-closing: 17:25-17:30 Closing auction: 17:30 Fixing: Pre-opening: 07:15 Auctions: 10:30 and 16:00	Continuous trading: Pre-opening: 07:15-09:00 Session: 09:00-17:25 Pre-closing: 17:25-17:30 Closing auction: 17:30 Fixing: Pre-opening: 07:15 Auctions: 10:30 and 16:00	Continuous trading: Pre-opening: 07:15-09:00 Session: 09:00-17:25 Pre-closing: 17:25-17:30 Closing auction: 17:30 Fixing: Pre-opening: 07:15 Auctions: 10:30 and 16:00	Pre-opening: 07:15 Auction: 15:30
Central counterparty	Clearnet SA	Clearnet SA	Clearnet SA	Clearnet SA (when securities are deposited with Euroclear France)
Settlement System	RGV2	RGV2	RGV2	RGV2

The derivatives markets

The French derivatives markets are MATIF and MONEP, whose characteristics are described in the following table.

	Regulated markets	
	MATIF	MONEP
Traded financial instruments	Futures and options on futures for interest rates Commodity futures	Equity and index options Index futures
Trading rules	Central Order Book	Central Order Book
Trading platform	NSC-VF (futures version) NSC-VO (options version)	NSC-VF (futures version) NSC-VO (options version)
Trading hours	Interest rate instruments: Pre-opening: 07:15-08:00 Session: 08:00-17:30 Night session: 17:30-22:00 Commodity instruments: Pre-opening: 10:30-10:45 Morning session: 10:45-13:00 Pre-opening afternoon session: 14:45-15:00 Afternoon session: 15:00	Depending on the contracts
Central counterparty	Clearnet SA	Clearnet SA

In September 2001, Euronext launched Winefex Bordeaux, a futures contract for Bordeaux red wines traded under the MATIF rules.

5.1.2.2 Trading rules

Financial instruments are traded on the Euronext trading platform either continuously for securities that are liquid enough or securities with a liquidity provider willing to accept certain obligations, or when they are less liquid by auction (single or double fixing). Less liquid derivative instruments can also be traded by auction on demand ("multi-fixing").

The financial instruments are divided into trading groups based on different trading procedures. The composition of these groups, determined on the basis of factors such as the particular characteristics and liquidity of the financial instruments, is detailed in the appendix of the Euronext cash market trading manual.³ Financial instruments within the same group are subject to the same timetable and price variation rules.

Liquidity of the financial instruments is eased on the cash regulated markets by liquidity providers. For securities trading continuously, two types of liquidity providers exist: permanent liquidity providers are required to provide quotes (to maintain a spread of bid and offer prices) in normal auctions, during the main trading session and in interim auctions resulting from volatility interruptions, while volatility liquidity providers are required to enter quotes during all auctions, ie normal opening and closing auctions as well as interim auctions resulting from volatility interruptions. For securities trading by auction, auction liquidity providers are obliged to maintain a spread of bid and offer prices during the order accumulation period preceding auctions held at fixed times. Specific liquidity providers are also operating on bond markets.

In addition to the Central Order Book (COB), MATIF and MONEP are supplemented by market-makers, who continuously offer bid/ask spreads available on the COB.

³ Euronext Instruction no 4-01, available on the Euronext Paris website: www.bourse-de-paris.fr.

In order to foster trades by institutional investors on large amounts of equities, rules for “block trading” were introduced in 1994 for the biggest stocks of the Premier Marché. The aim of this mechanism is to increase the liquidity of the market without questioning the rules of an order-driven market. Thanks to “block trading”, large amount orders are executed immediately at a price derived from the price on the central market.

With regard to shares, block trades, now available on the three cash regulated markets, are transactions that are at least equal to the following thresholds (defined as “Normal Block Size” - NBS): EUR 500,000 in the case of shares included in the Euronext 100 segment, EUR 250,000 in the case of shares included in the Next 150 segment, EUR 100,000 in the case of all other shares traded on a continuous basis and EUR 50,000 in the case of shares traded only through call auction procedures.

Ordinary block trades must be effected within ranges which vary with the securities trading group and size of the NBS (maximum of 5% below the best bid limit price to 5% above the best ask limit price displayed in the COB).

With regard to bonds, block trades must be greater than EUR 250,000 in the case of bonds traded on a continuous basis and EUR 100,000 in the case of bonds traded only through call auction procedures. Block trades in bonds must be effected at prices within the following ranges: 0.5% around the last traded price for bonds traded continuously and 1% around the last traded price for bonds traded through call auction procedures.

5.1.2.3 Trading platform

In 1986, the French stock exchange replaced open outcry trading with a computerised trading system called CAC based on an order-driven approach in which the price is the result of the confrontation between buy and sell orders. Since 1995, the French stock exchange has set up a new electronic trading system called NSC. Thanks to this system, trading takes place through member firms acting as brokers and connected by workstations to the central computers of Euronext Paris SA. For each relevant security, the orders entered in the system are ranked first by price limit (for example, a buy order with a higher limit is executed before an order with lower limit) and then in chronological order. The NSC platform has been retained as the Euronext common trading platform for cash markets.

5.1.2.4 Evolution under way

The aim of Euronext is to offer a single market with:

A single trading platform

In October 2001, the implementation of the NSC platform in the cash markets was completed in the three Euronext marketplaces. The implementation of the NSC platform is now under way on the Lisbon stock-exchange. For the derivatives markets, the LIFFE CONNECT™ platform has been chosen as the common trading platform, and should be implemented soon on the French derivatives markets.

A single Central Order Book

The aim of Euronext is to set up a single Central Order Book, on which the market participants of the Euronext exchanges, including in the next few years the Lisbon stock-exchange will trade the most liquid securities of each market at the same time.

During the transition period, Euronext decided to launch “Euronext List”, which encompasses quoted companies of the three stock exchanges. These companies, which are currently quoted separately in the local central books of Euronext stock exchanges, comply with common standards, especially in terms of financial transparency. Euronext List is composed of two segments, NextEconomy and NextPrime, which comprise companies from sectors related to the new economy and companies from the traditional sectors respectively.

5.2 Clearing

5.2.1 Institutional aspects

5.2.1.1 General legal aspects

The general legal framework applicable to clearing by a central counterparty relies on Article L 431-7 and Articles L 442-1 to 442-9 of the CoMF.

Article L 442-6 enforces the full ownership rights of the clearing house over the deposits and margin calls of its members whether in cash or in securities, whereas Article 431-7 recognises the validity of multilateral netting performed by the clearing house for operations on financial instruments within the scope of the law.

5.2.1.2 Recent evolution of the clearing organisation

Prior to their merger in May 1999 there were three clearing houses in France:

- SBF for equity trades and options;
- Matif SA for exchange-traded derivatives; and
- BCC for repo and outright trades on government debt securities (Clearnet service).

Then, following the merger between the Belgian, Dutch and French stock exchanges, Clearnet became a subsidiary of the Euronext Group. As from 1 February 2001, Clearnet SA has legally become the single clearing house of the Euronext markets, following a merger process with the Dutch and Belgian clearing houses.

Following the agreement between Euronext and Euroclear, Euroclear has taken an ownership interest of up to 20% in Clearnet SA.

5.2.1.3 Supervision and regulation

Under Article L 442-1 of the CoMF, clearing houses must have the status of credit institution. Clearnet SA is a limited purpose credit institution pursuant to the French Banking Act. Accordingly it is supervised by the Banking Commission (Commission Bancaire - CB), which is the French banking supervisor.

The CMF is in charge of establishing (in particular through its rules of procedure) the conditions for the approval of the clearing house rules. This was actually achieved in Chapter II of Title IV of the rules of procedure of the CMF.

Pursuant to the Bank of France's Statute (recently codified as Article L 141-4 of the CoMF) "the Bank of France shall ensure the smooth operation and the security of payment systems within the framework of the tasks of the European System of Central Banks relating to the promotion of the smooth operation of payment systems". In addition, Act 2001-1168 of 11 December 2001 amended Article L 141-4 of the CoMF to further clarify the oversight competence of the Bank of France as regards CCPs. It states that the Bank of France oversees CCPs within the framework of the European System of Central Banks, without any prejudice to the securities and banking regulator competencies.

In January 2001, the Bank of France, the CMF, the CB, the National Bank of Belgium, the Banking and Finance Commission (Belgium), the Financial Markets Authority (Au-FM) of the Netherlands (formerly STE) and the Netherlands Bank agreed on a Memorandum of Understanding which organises the cooperation between the signatory authorities for the supervision and oversight of the clearing activities of the Euronext Group. This MoU is the second part of a general MoU covering the regulation and oversight of the whole Euronext Group.

5.2.1.4 Access criteria

As from 1 February 2001, former clearing members of BXS and AEX have become remote clearing members of Clearnet. During a transitional period ending on 31 December 2002, Belgian and Dutch clearing members which do not fulfil Clearnet's financial criteria have to submit and implement a plan indicating how they intend to comply with them before the end of the period.

In France, pursuant to Article L 442-2 of the CoMF, credit institutions, investment firms and entities whose sole purpose is to provide financial instrument clearing services can be admitted as members of the clearing house. All these categories fall within the scope of the prudential supervision of the CB. Additional criteria also need to be fulfilled (minimum capital requirements).

A clearing member can be either a general clearing member (which clears operations for its own account and on behalf of brokers) or an individual clearing member (which clears only its own trades). Capital requirements are different for general and individual clearing members.

The fulfilment of financial and operational access criteria is checked for applicants but also subject to ongoing monitoring for admitted participants according to a process common to all clearing members whatever the market they operate in.

5.2.2 Operational aspects

5.2.2.1 Range of instruments cleared

Clearnet SA acts as central counterparty, offering its guarantee against daily initial and variation margin calls for a wide range of financial instruments: stock exchange transactions traded on systems managed by the Euronext markets, financial and exchange-traded commodities futures and options, equity and index options and OTC securities trades (Clearnet OTC).

The Clearnet OTC system (a specific service of Clearnet SA launched in October 1998) clears and nets all outright and repo transactions on French government securities negotiated through the inter-dealer brokers Prominnofi and MTS France. The service was extended to German bunds in April 1999.

5.2.2.2 Guarantee provided and risk management

Clearnet SA acts as central counterparty for instruments admitted to its operations. Once a trade has been transmitted to the clearing house, it is registered and Clearnet SA becomes the counterparty of both the seller and the purchaser. The guarantee provided by Clearnet SA includes the cash value of clearing members' positions but also, regarding stock exchange transactions, a procedure to deliver securities to the purchaser on behalf of the defaulting seller. While acting as central counterparty, Clearnet contributes to reducing credit and liquidity risks associated with the trading and delivery of Euronext instruments. In order to perform its guarantee Clearnet implements a wide range of risk control measures: tight access criteria, marked to market valuation of its clearing members' exposures, margin calls and clearing funds.

The guarantee provided by the clearing house covers only its members. The protection of customers is ensured by the participation of clearing members in a guarantee fund. However, individual customers have the possibility to be covered directly by the guarantee of the clearing house, provided they pay a fee, they post deposits and margin calls on a gross basis and their transactions are booked with the clearing house.

There are two types of margin requirements:

- initial margin (deposits) aims at covering the upcoming risk on the open positions registered with the clearing house; and
- variation margin or margin calls cover the price difference between the original price of the registered position and the marked to market price.

Exposures and margin calls are valued at least daily. Additional deposits are called for positions with risks that appear to be insufficiently covered by the existing deposits. As regards futures and options, intraday price variation limits apply to instruments. If the limit is breached, an intraday margin call has to be completed.

There is currently a clearing fund for Dutch derivatives clearing activities, and a clearing fund common to Belgian and French clearing members is to be progressively called. The Dutch fund for cash clearing activities is being integrated into this common fund as from the implementation of Clearing 21 on Dutch cash markets. Following the complete implementation of Clearing 21 (see below), there will be a single clearing fund covering regulated markets for all clearing members. It will be intended to be sufficient in size to cover a default of the largest clearing member. The "largest clearing member" is defined as the clearing member that is responsible for the highest uncovered risk to the clearing

system of Clearnet. The size of the clearing fund is therefore based on the highest uncovered risk of a clearing member. For each clearing member the relative weight of its uncovered risk in relation to the total sum of the uncovered risks of all clearing members determines the size of its contribution to the clearing fund.

With regard to financial futures and options, other risk control measures are also implemented, such as individual exposure limits and market share limits (in order to avoid market manipulation).

In the event of default by a clearing member, the clearing house may transfer the positions of its customers to another clearing member, or liquidate them to extinguish its obligations or mobilise its deposits and collateral to cover potential losses.

In addition to the amount of deposits and collateral of the defaulter, the soundness of the guarantee provided by Clearnet SA relies ultimately on its insurance arrangements and its own capital.

5.2.2.3 Clearing platform

In France, Clearnet is used for cash and derivative markets.

Since September 2000, Clearnet SA has implemented a new clearing platform, called Clearing 21, which aims at offering a technical standard for global players and at permitting cross-product margining. Clearing 21, developed with the Chicago Mercantile Exchange and Nymex, is an integrated system for both cash and derivatives products, operating in real time pursuant to the Span margining model. Clearing 21 is a multicurrency platform which also provides comprehensive real-time information to clearing members on, for example, the type of instrument handled, the position and the type of account. Clearing 21 provides services for the whole post-trade process including the feeding of the account of the clearing member, the management of positions, the calculation of risk margins, and the generation and sending of delivery/settlement instructions.

Formerly, initial margin and margin calls were calculated separately for each type of instrument cleared by the clearing house. Since the launch of the Clearing 21 platform on 8 September 2000, French clearing members have benefited from the possibility to cross-margin futures and options positions with underlying stocks.

Since March 2002, Clearnet 21 has become the new clearing platform for cash markets in Brussels. The migration of the participants in Brussels to C21 is a new step in the move to a single platform for all Clearnet members. Clearing 21 will soon be implemented on Dutch cash markets.

5.2.2.4 Evolution under way

Clearnet SA has taken a range of measures to confirm its position as a major player in the field of clearing activities in Europe.

Clearing 21 is implemented on cash and derivatives markets in France and on cash markets in Belgium; the implementation of C21 on Dutch cash markets will be achieved by the end of 2002. As soon as C21 is fully implemented in Belgium and the Netherlands, the Clearing 21 platform will become the common clearing system for all Euronext markets. The interim period is being used to align the risk management practices of the three previous clearing houses, and when the clearing platform is implemented, a single risk management procedure will be used. Furthermore, following the merger of the Portuguese stock exchange (BVLP - Bolsa de Valores Lisboa Porto) with Euronext, Portugal will need to harmonise its clearing system in order to enlarge the scope of Clearnet's activities to this fourth national market.

5.3 Settlement

5.3.1 Institutional aspects

5.3.1.1 General legal aspects

The full dematerialisation of securities was achieved in France with the implementation of the Act of 30 December 1981 and the Decree of 2 May 1983. Accordingly, all securities transactions are settled in France through book-entry systems.

The general legal framework applicable to securities settlement systems was substantially modified following the Financial Activity Modernisation Act 96-597 passed on 2 July 1996 and amended by the Act of 2 July 1998. In particular, Article 32-16 was amended to specify that the General Regulations of the CMF shall determine “the general organisational and operational principles of financial instrument settlement and delivery systems and the conditions under which the CMF approves the operating rules of such systems, without prejudice to the powers granted to the Bank of France by Article 4 of Act 93-980 of 4 August 1993 on the Statute of the Bank of France and the activities and supervision of credit institutions”.

In addition, Act 2001-1168 of 11 December 2001 amended Article L 141-4 of the CoMF to further clarify the oversight competence of the Bank of France as regards SCSSs. It states that the Bank of France oversees CCPs and SSSs within the framework of the European System of Central Banks, without any prejudice to the securities regulators’ and banking supervisors’ competencies.

The Act of 2 July 1998 also amended Article 93-1 of the Banking Act in order to clarify that the abrogation of any “zero hour” provision applies not only to payment systems but also to securities settlement systems.

5.3.1.2 The role of the central bank

The Bank of France played a major role in the reorganisation of the infrastructure for the settlement of securities in 1995, when it was decided to close down SATURNE, a SSS managed by the central bank, and to launch a new system, RGV, applying irrevocable operation in central bank money. Since the actual closing down of SATURNE in July 1998, the Bank of France is no longer involved in the operation of SSSs. However, it is the settlement agent of the French SSS.

The statutory competence of the Bank of France in the field of oversight of payment systems also explicitly covers SCSSs. Well designed and efficient securities settlement systems are important for the stability of the financial system. One of the main functions of such systems is to ensure delivery of the collateral used in Eurosystem credit operations and DVP in over-the-counter large-value transactions between intermediaries.

5.3.1.3 Oversight and regulation

In 2002, the French, Belgian and Dutch competent authorities signed a Memorandum of Understanding in order to coordinate the oversight and prudential supervision of the securities settlement services provided by Euroclear Bank for trades on Euronext markets. The authorities participating in the Settlement Committee Euronext are the Bank of France and the Financial Markets Council for France, the National Bank of Belgium and the Banking and Finance Commission for Belgium, and the Netherlands Bank and the Financial Markets Authority for the Netherlands.

5.3.1.4 The role of other public and private sector bodies

Sicovam SA (Société Interprofessionnelle pour la Compensation des Valeurs Mobilières SA), created in 1949, merged with Euroclear Bank in January 2001 and became Euroclear France, which is the French central securities depository (CSD) and operates RGV2.

5.3.2 Recent evolution of SSS organisation

5.3.2.1 Implementation of Relit Grande Vitesse 2 (RGV2)

In 1994, when the French financial community decided to switch to a new form of organisation, the settlement of transactions involving securities was split between two systems:

- SATURNE, which was created by the Bank of France in 1988 to manage Treasury bills and notes and which was extended to all negotiable short-term instruments (eg commercial paper, medium term notes);
- Relit, managed by Sicovam SA, settling since 1990 all transactions in marketable securities, including bonds (government debt, public sector as well as corporate bonds) and equities.

As they used to deliver the securities on a gross basis and settle the cash leg on a net basis, both Relit and SATURNE were “model 2” securities settlement systems according to the definitions generally used by central banks since the BIS report released in 1992. As the organisation of the

banks' accounts at the Bank of France prevailing until 1997 did not provide for intraday finality of payment but only for end-of-day finality, the settlement of the cash leg and consequently the delivery of the securities handled in SATURNE and in RGV only became final at the close of the Bank of France's business day at 6.30 pm.

In order to improve the situation, the Bank of France, Sicovam SA and the AFEC (French Association of Credit Institutions) reached a partnership agreement in January 1995. According to the terms of this agreement, it was decided:

- to implement a new real-time large value securities settlement system, called Relit Grande Vitesse (High Speed Relit), managed by Sicovam SA, now Euroclear France;
- to shut down the SATURNE system and to integrate its operations into RGV, which was actually achieved in July 1998; and
- to increase the Bank of France's stake in Sicovam SA to 40%.

This new framework for securities settlements systems relies on the following principles:

- the RGV system, which became operational in February 1998, operates on a gross basis for the securities as well as for the cash leg (model 1), providing irrevocable and final settlement in real time. The system handles transactions continuously within very wide operating hours (8 pm on T-1 to 5 pm on T for market operations).
- the settlement of the cash leg is done in central bank money.

In June 2001, the structure of the SSS was reshaped slightly and RGV2 was created. The RGV2 project had two components:

- a technical component: on 11 June 2001, the Relit platform was closed and the operations previously settled through this platform (mainly stock exchange transactions) moved to the RGV/Relit+ platform, called "RGV2" platform. Before this evolution, there used to be two platforms in France bearing three SSSs: Relit, Relit+ and RGV. The Relit platform, launched in 1990, operated on a batch basis while the Relit+/RGV platform relies on a more modern IT structure, allowing for processing operation by operation. Following the closure of the Relit platform, there is only one technical platform, RGV2, bearing two streams, the "revocable RGV2 stream" (previously Relit+) and the "irrevocable RGV2 stream" (previously RGV). In the first stream there are several final settlements during the day while the second stream is a real-time gross settlement system providing immediate finality. Notwithstanding this technical evolution, the operating rules of both systems have not changed;
- a banking component: on 18 June 2001, OTC equities trades became eligible to RGV. This evolution allows OTC equities lending and repo operations to benefit from the real-time irrevocability processing of RGV in central bank money. However, as equities are not eligible for the Bank of France Tier 2 list, these OTC equities trades cannot benefit from the so-called self-collateralisation process. This new pattern of RGV does not concern the settlement of Bank of France credit operations.

The RTGS stream settles monetary policy operations and all large-value transactions, mainly on fixed income securities, on a gross basis and allows final intraday settlement in central bank money. Participants have central bank money accounts, which can be supplied via the links between TBF and the RGV2 system at any moment of the day.

The other stream settles operations on regulated markets (as well as a number of OTC operations) on a gross basis for the securities leg and on a net basis for the cash leg. This stream operates on the basis of deferred irrevocability until the settlement of the cash balances occurs in TBF.

5.3.2.2 *Merger with Euroclear*

On 23 November 1999, Euroclear, Clearnet SBF SA and Sicovam SA announced an agreement to establish an alliance to offer the market a pan-European solution for clearance and settlement, and netting services.

On 24 March 2000, the Euroclear and Sicovam SA boards announced the signing of an agreement in principle to fully merge the two settlement organisations. The final agreement was signed on 21 September 2000 and has been effective since January 2001.

According to the agreement, Sicovam SA has become Euroclear France, a wholly owned subsidiary of the Euroclear bank that remains incorporated in France. Former Sicovam shareholders have become new shareholders in Euroclear Clearance System plc; in addition, the Bank of France, which used to hold 40% of Sicovam, has sold its stake in Euroclear France. Finally, the Euroclear group has taken an ownership interest of 20% in Clearnet SA.

5.3.3 RGV2: the non-RTGS stream

5.3.3.1 Major regulations

The rules of the non-RTGS stream were approved by the CMF on 19 December 2001.

5.3.3.2 Participation in the system

Credit institutions and investment firms licensed in France or established in the EEA and allowed to use the European passport, as well as CSDs, can be admitted to the system. Other French or foreign institutions can also have access to RGV2, provided the CMF does not veto their participation (for risks prevention purposes).

5.3.3.3 Types of transactions handled in the non-RTGS stream

The non-RTGS stream settles transactions traded on the Euronext Paris regulated markets such as the primary market, the grey market and the secondary market, both outright and securities lending transactions. The non-RTGS stream settles mainly retail equity transactions but also transactions on all securities which are not eligible for the RTGS stream and transactions on securities eligible for the RTGS stream but which do not require immediate finality.

Ordinary OTC operations can be settled on the RTGS or on the non-RTGS stream.

5.3.3.4 Operation of the system

The non-RTGS stream is based on three matching and presettlement subsystems, plus a settlement subsystem:

ISB - inter-brokers subsystem (Sous-système Inter-sociétés de Bourse): the ISB subsystem is managed by the clearing house Clearnet SA to clear the regulated market operations of its participants.

SBI - brokers-intermediaries subsystem (Sous-système d'Ajustement Sociétés de Bourse-Intermédiaires): the SBI subsystem managed by Euroclear France prepares in automatic form the settlement of stock exchange transactions between stockbrokers and other financial intermediaries.

SLAB delivery by mutual consent system (Sous-système de Livraison par Accord Bilatéral): the SLAB subsystem, also managed by Euroclear France, processes OTC transactions entered into by mutual consent between two parties.

Settlement Subsystem (Sous-système de Dénouement): the subsystem ensures the settlement of transactions streamed by SBI and SLAB, as well as free of payment (FOP) transactions entered into directly by the participants and corporate actions initiated by Euroclear France.

5.3.3.5 Settlement procedures

The non-RTGS stream is a "model 2" SSS: a net cash balance is calculated for each participant, whereas the securities leg is settled on a gross basis. Three times a day, net cash balances are posted to the TBF accounts of the participants or to accounts of the TBF settlement agents they have designated to settle their cash position on their behalf. Once the cash settlement has been completed, the DVP process of the related chaining becomes final. The three settlement stages occur at 10.15 am (almost completed at 11.00 am), 3.00 pm (final completion before 3.45 pm) and 4.25 pm (final completion before 5 pm).

5.3.4 RGV2: the RTGS stream

5.3.4.1 Major regulations

Rules of the RTGS stream were approved by the CMF on 19 December 2001.

5.3.4.2 Participation in the system

Credit institutions and investment firms licensed in France or established in the EEA and allowed to use the European passport, as well as CSDs, can be admitted to the system. Other French or foreign institutions can also have access to RGV2, provided the CMF does not veto their participation (for risks prevention purposes).

However, only institutions that fulfil the statutory access criteria for participation in TBF are allowed to be settlement participants and to open a cash position.

5.3.4.3 Types of transactions handled

The RTGS stream is firstly used to settle Bank of France credit operations, including monetary policy operations, and intraday credit in TBF against collateral deposited in Euroclear France. These operations cannot be settled in the non RTGS-stream. The Bank of France uses repos to implement monetary policy and intraday credit operations. Collateral is managed in an earmarking procedure. The whole settlement process is ensured by Euroclear France, which provides all requested services, including the valuation and administration of collateral, within operating times fully compliant with TARGET requirements.

The RTGS stream is also used for all large-value transactions between financial intermediaries on fixed income securities, both outright trades and repurchase agreements. Since 18 June 2001, OTC trades on equities have also been eligible for the RTGS stream.

Ordinary OTC operations can be settled on the RTGS or non-RTGS stream.

5.3.4.4 Operating principles of the system

The RTGS stream is a model 1 SSS, operating in central bank money, in real time and with immediate finality.

This settlement system relies on the following principles:

- it uses purchasing power in central bank money associated with a self-collateralisation mechanism to ensure the intraday final settlement of the transactions handled;
- there is a real-time bridge between the RTGS stream and TBF allowing for the smooth and immediate transfer of central bank money in both directions.

Purchasing power and self-collateralisation

In order to enable each participant to settle securities purchases through the DVP system, the RTGS stream of RGV2 monitors purchasing power, which includes two components:

- (1) Central bank balances on accounts open on the books of the Bank of France but operated within the SSS. The use of central bank money directly in the settlement process within the SSS allows for continuous real-time settlement of securities transactions in central bank money. The cash assets are supplied by means of the sale of securities within the RGV2 RTGS stream, transfers from TBF and intraday credit operations (Pensions Livrées Intrajournalières - PLIs) implemented at the discretion of the counterparties according to their liquidity needs.
- (2) Automated intraday repos (Pensions Livrées Conservatoires - PLCs) set up within the settlement process with stocks or flows of securities eligible for use as collateral with the Bank of France. In fact, for participants who do not have the necessary cash to settle securities purchases at the end of the processing procedure, this settlement system automatically transforms the asset component of the purchasing power into actual central bank money through intraday repurchase agreements with the Bank of France using securities in stock (earmarked before the start of each operating day by the participant as potential collateral) or by using securities under processing.

In any event, all intraday repurchase agreements have to be reimbursed before the end of the business day. At the end of the day, the RTGS stream automatically tries to settle the reimbursement of the intraday repos.

If participants have sufficient cash to reimburse the repos, their TBF accounts are debited, thereby settling the Euroclear France account in TBF. If, exceptionally, a participant does not have the funds to reimburse the repo, Euroclear France settles the whole intraday repo and sets up an overnight repo for the outstanding cash balance with part (or all) of the securities.

The bridge between TBF and RGV2

Participants may transfer central bank money between the system and TBF at any time of the day. These transfers are triggered either automatically at certain times of the day or on the instructions of participants.

A participant can, at will, transfer cash from its TBF account to the RTGS stream of RGV2 using simple TBF instructions or from its cash position in the system to its TBF account.

In addition to these procedures for cash transfers originated by the participants, Euroclear France automatically transfers cash balances from the system to the TBF accounts once in the morning (RGV 05) and three times in the afternoon (RGV 10, 20 and 30).

During the business day, participants may reimburse the intraday repurchase agreements at any time provided their cash balance is sufficient.

5.3.4.5 RGV2 RTGS stream operating day

The operating day starts at 8 pm the day before. Night processing permits the settlement of trades agreed the previous day. After night processing, RGV2 is able to settle same day value transactions until 5 pm; monetary policy operations of the Bank of France can be settled until 6.30 pm.

5.3.4.6 Risk management

The assessment of all SSSs which applied to settle ESCB credit operations against the nine standards established by the ESCB was conducted in the course of 1998 and the list of eligible SSSs was released in September 1999. At this time, the RGV system was the only system in the euro area which fully complied with all standards and was therefore able to settle transactions with intraday finality on a DVP basis and in central bank money, within the broad TARGET operating hours and based upon a very reliable technical framework.

Thanks to the mechanism for automatically setting up intraday repos, DVP transactions within the RTGS stream of RGV2 (formerly the RGV system) always become final during the course of the day and the average percentage of transactions remaining unsettled at the end of the day is remarkably low.

5.3.4.7 International links

International links with other SSSs use SWIFT securities messages. Securities issued in 11 foreign securities settlement systems may be lodged as collateral at the Bank of France directly through the RTGS stream, using the eligible FOP links established by Euroclear France with foreign CSDs: Clearstream Germany in Germany, OeKB in Austria, the National Bank of Belgium's system, Euroclear and CIK in Belgium, CADE and SCLV in Spain, APK in Finland, Monte Titoli in Italy, Negicex in the Netherlands and Clearstream Banking Luxembourg in Luxembourg.

5.3.4.8 Pricing

Participants are charged a custody fee and a transaction fee.

5.3.5 Evolution under way

Following the recent merger of Euroclear and CRESTCo, the British CSD, a new scheme for operational integration is being designed, with a view to creating a single settlement platform within the next few years for the settlement of French, British, Irish, Dutch and partly Belgian securities.

5.4 The use of the securities infrastructure by the Bank of France

The Bank of France is the cornerstone of the French securities settlement organisation. The Central Bank ensures central bank money settlement with intraday finality and provides a permanent bridge between the cash (TBF) and the securities (RGV2) settlement systems.

5.4.1 The Bank of France as liquidity provider in the SSS

The French securities settlement system RTGS stream offers intraday finality thanks to cash positions administered within RGV2, which form the cash balance component of the purchasing power and are considered as subaccounts on the Bank of France's books, and to the use of intraday repos (PLC) managed by the Bank of France.

The Bank of France provides a permanent bridge between the RGV2 RTGS stream and TBF, formed by transfers of liquidity in central bank money.

The system provides an instrument to settle intraday repos in TBF called Pension livrée intrajournalière (PLI). The PLI has common features with RGV2 automatic repos: no interest is paid to the Bank of France, the repo must be redeemed before the end of the day, otherwise it is turned into an overnight repo at a high penalty rate, and the repo is set up by the SSS. However, there is one major difference: the cash leg is settled in TBF (and not in RGV2) in order to provide the participant with central bank liquidity.

The PLI is completed in three steps:

- the participant enters an instruction into RGV2 specifying the amount of cash needed;
- the securities given as collateral are checked by the SSS (if the valuation is not sufficient, there is a recycling of the participant's instruction during the day); and
- the repo is settled: the securities are credited on a Bank of France custody account and the cash is credited on the participant's cash balance and then transferred to the participant's account in TBF.

5.4.2 Money market operations

The TBF and the RGV2 RTGS stream are the systems used by the Bank of France for money market operations. The overnight repos share common features with the intraday repos since the securities are settled in the RTGS stream and the cash is credited to TBF accounts. However, the process is different because matching takes place between the participant's and the Bank of France's instructions. Thus, following the allotment results, the Bank of France informs the SSS of the cash amount given to each of its counterparties. Each counterparty enters its instructions specifying the collateral used, after which RGV2 matches the instructions.

For the redemption of monetary policy operations, the SSS checks the availability of funds in RGV2 (and not in TBF since it has no direct access to the participants' accounts with TBF). Therefore, the participants have to monitor their cash balance in the RGV 2 system in order to plan the redemption of the repo.

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List of abbreviations

AZV	Cross-border payments procedure (via correspondent banks) - <i>Auslandszahlungsverkehr</i>
BaFin	German Federal Financial Supervisory Authority - <i>Bundesanstalt für Finanzdienstleistungsaufsicht</i>
BBankG	Bundesbank Act - <i>Bundesbankgesetz</i>
BLZ	Bank sort code - <i>Bankleitzahl</i>
BörsG	Stock Exchange Act - <i>Börsengesetz</i>
BSE	Paperless cheque collection procedure/cheque truncation - <i>Belegloser Scheckeinzug</i>
BSI	Federal Agency for Security in Information Technology - <i>Bundesamt für Sicherheit in der Informationstechnik</i>
DEA	Data input and output system - <i>Daten-Eingabe- und -Ausgabe-System</i>
DTB	German Futures and Options Exchange - <i>Deutsche Terminbörse</i>
EADK	Electronic order placing, data transmission and account information - <i>Elektronische Auftragserteilung, Datenauslieferung und Kontoinformation</i>
EAF	Euro Access Frankfurt - <i>Elektronische Abrechnung Frankfurt</i>
EDIFACT	Electronic Data Interchange for Administration, Commerce and Transport
EDM	Electronic data media
ELS	Euro Link System - <i>Elektronischer Schalter</i>
ELV	Electronic direct debit system - <i>Elektronischer Lastschriftverkehr</i>
EMZ	Retail Payment System (see RPS) - <i>Elektronischer Massenzahlungsverkehr</i>
Eurex	European exchange (common futures and options market of the German and Swiss stock exchanges) - <i>Gemeinsamer Terminmarkt für Finanzderivate der deutschen und schweizerischen Börse</i>
FWB	Frankfurt Stock Exchange - <i>Frankfurter Wertpapierbörse</i>
GSE	Large-value cheque collection procedure - <i>Großbetrag-Scheckeinzugsverfahren</i>
GZS	Payment transaction company for the German banking sector - <i>Gesellschaft für Zahlungssysteme mbH</i>
HÜST	Trading Supervision Authority - <i>Handelsüberwachungsstelle</i>
HVRZ	High-availability computer centre - <i>Hochverfügbarkeitsrechenzentrum</i>
ICS	Information and control system - <i>ISS; Informations- und Steuerungssystem</i>
KWG	Banking Act - <i>Kreditwesengesetz</i>
MaH	Minimum requirements for the trading activities of credit institutions - <i>Mindestanforderungen an das Betreiben von Handelsgeschäften</i>
MVS	Multiple virtual storage (mainframe operating system)
RPS	Retail Payment System - <i>Elektronischer Massenzahlungsverkehr</i> (see EMZ)
RTGS ^{plus}	Real-time gross settlement system of the Deutsche Bundesbank with liquidity-saving elements (also the German TARGET component) - <i>Das Bruttozahlungssystem der Bundesbank mit liquiditätssparenden Elementen (gleichzeitig deutsche TARGET-Komponente)</i>
RTS	Real-time settlement
SDS	Same day settlement
STD	Standard settlement
VPN	Virtual private network
WpHG	German Securities Trading Act - <i>Wertpapierhandelsgesetz</i>
XETRA	Exchange Electronic Trading (electronic spot trading system of Deutsche Börse AG) - <i>Elektronisches Kassa-Handelssystem der Deutsche Börse AG</i>
ZKA	Central Credit Committee of the German banking associations - <i>Zentraler Kreditausschuss</i>

1. Institutional aspects

1.1 The general institutional framework

1.1.1 *Legal requirements and public bodies*

According to Section 1 (9) of the German Banking Act (KWG) of 1961, last amended in 2001, the “provision of cashless payment and clearing operations (giro business)” is a banking activity. As such it requires a licence from the German Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht; BaFin), provided that the permission to conduct payment transactions is not based on special laws, as is the case for the Deutsche Bundesbank. A bank is a company which conducts banking transactions professionally or to an extent that requires a commercially organised business. Hence, non-banks are not allowed to handle cashless payment transactions.

The responsibilities and powers of the German central bank are laid down in the Bundesbank Act (BBankG) of 1957 (amended on 22 March 2002, entered into force on 30 April 2002). According to Section 3 of the BBankG, the Deutsche Bundesbank shall arrange for the execution of domestic and international payments. Furthermore, it is now explicitly stated that the Deutsche Bundesbank shall contribute to the stability of payment and clearing systems. In addition, the tasks of the ECB with respect to payment systems are mentioned in Article 105 (2) of the Treaty establishing the European Community (Treaty) as well as in Articles 3 and 22 of the Statute of the European System of Central Banks and of the European Central Bank (Statute).

Within the limits of antitrust law, the German banking sector coordinates the organisational and technical procedures through the Working Group of the Central Credit Committee of the German banking industry (Arbeitskreis des Zentralen Kreditausschusses; ZKA) in order to ensure the efficient, fast and secure handling of payment transactions. The handling of payment transactions between banks and networks is contractually regulated in various conventions and agreements.

The relationship between a bank and its customers is based on the General Business Conditions of the banks and/or of the Deutsche Bundesbank.

According to the Act against restraints of competition of 1966 (Gesetz gegen Wettbewerbsbeschränkungen), contracts or resolutions on the uniform regulation of the handling of payment transactions are to be reported to the Federal Cartel Office through the BaFin, stating reasons. Both of these offices have the task of ensuring that unwanted developments relating to banking supervision and excessive restraining effects on competition are avoided. In particular, they must ensure that the regulations do not unilaterally disadvantage other parties involved in payment transactions, namely the banks’ customers. If no report is made, the relevant agreements or resolutions are invalid.

1.1.2 *Credit Transfer Act and other specific regulations relating to payment services*

With the Credit Transfer Act (Überweisungsgesetz), which came into effect on 14 August 1999 for cross-border credit transfers to countries of the European Community (EC) or the European Economic Area (EEA) and on 1 January 2002 for domestic credit transfers and credit transfers to third countries, Directive 97/5/EC was incorporated into German law and a new legal foundation was created in the German Civil Code (Sections 675-676g).

The regulation provides a new legal basis in the form of specific rules for credit transfers, payment and giro agreements. The law establishes three new legal relationships in the form of different contracts: between the originator of a credit transfer and the accepting credit institution there is the credit transfer agreement, between the processing credit institutions a payment agreement, and between the beneficiary and its credit institution a giro agreement.

According to the Act, a credit institution has transparency obligations to its customers, eg to provide information about the execution time, prices, other costs of each credit transfer and other relevant details. Also, credit transfers have to be effected within certain time limits: domestic in-house transactions have to be credited within one bank business day, domestic transactions to other credit institutions within three bank business days, and transactions within the EC and the EEA within five bank business days. The beneficiary’s credit institution has another day to credit the customer’s

account. Other international transactions have to be effected as soon as possible. This term is being used because of the various existing business relationships with third countries.

The Credit Transfer Act contains various regulations with regard to consumer protection. If a credit institution accepts a credit transfer and it is carried out late, the accepting credit institution has to pay interest which amounts to the base rate according to the German Civil Code plus 5%. If the transfer gets lost, a "money back guarantee" applies for amounts up to EUR 12,500 plus interests and charges. Other liabilities are unaffected by this Act. If the transaction is carried out as an "OUR" transfer (ie fees are to be borne by the originator of the payment only), the credit institution also has to refund any double-charging either to the originator or beneficiary. In Germany, the independent body dealing with customer complaints referring to the Credit Transfer Act is the Deutsche Bundesbank, which established the Arbitration Board for Credit Transfers.

Moreover, the Cheques Act of 1933 must be observed for the collection of cheques.

Of particular importance for electronic payments are the agreements relating to the conversion of paper-based transfers and the processing of electronic transfers (the Agreement on Credit Transfers, which came into force on 1 January 1999), cheques (the Agreement on Cheque Collection of 7 September 1998) and direct debits (the Agreement on Direct Debits of 1 January 1999), which regulate the relationships of banks with each other and with the Deutsche Bundesbank.

1.2 The role of the central bank

1.2.1 Oversight of payment systems

Oversight is an important role assumed by the Bundesbank in the field of payment transactions. This task is clarified with the latest amendment to Section 3 of the BBankG and is also recognised by the Treaty and the Statute as a basic task of the Eurosystem. Its aim is to ensure smooth payment transactions and encourage efficiency and security.

In practical terms, this function is exercised largely by means of the general agreements on procedures and standards jointly developed with the banking sector and via institutionalised dialogues in various official bodies. Moreover, the Deutsche Bundesbank itself offers services in the field of payments and processing and thus assumes an operational function. Additionally, the Bundesbank carries out a statistical survey on payment services every year, which has to a certain extent been of limited scope and on a voluntary basis so far. To improve the data - an important basis for the performance of the oversight role - the Bundesbank is considering implementing a statistical regulation in the near future. Such a regulation would entitle the Bundesbank to collect statistics from all credit institutions in Germany.

In exercising the oversight function, close cooperation between the bodies overseeing payments and the BaFin is of fundamental importance. In the field of electronic money the Deutsche Bundesbank also cooperates with the Federal Agency for Security in Information Technology (BSI) and takes advice from this body, as systems with electronically stored units of value are subject to a special security test.

The legal foundation for banking supervision is the KWG. The aim of this law is to safeguard the ability of the banking sector to function and protect creditors by monitoring the credit standing and liquidity of banks. The law aims to achieve this objective by respecting the principles of a market economy. Under the KWG, the supervision of banks is primarily the task of the BaFin, which, however, performs this task in cooperation with the Deutsche Bundesbank. The Deutsche Bundesbank is above all involved in the ongoing supervision of banks and in analysing reports and notices from banks. In addition, however, it is involved in quality control in connection with the minimum requirements for the trading activities of credit institutions (MaH) and internal risk models.

1.2.2 Payment systems of the Deutsche Bundesbank

Continuing the tradition of the former Reichsbank (ie its explicit mandate to handle payment transactions), the Deutsche Bundesbank is actively involved in processing payments, with the aim of achieving the following goals:

- an adequate share of cashless payments in general;

- the promotion of large-value payments in particular;
- subsidiary participation in retail payments;
- the provision of payment systems/services which are neutral with respect to competition;
- the promotion of safe and efficient procedures; and
- contributing to a reduction in processing times.

The Deutsche Bundesbank fulfils its statutory task of ensuring the processing of domestic and international payments by providing a neutral giro network available to the banks in the various banking groups and offering its services in the area of cashless payment transactions to holders of Deutsche Bundesbank accounts in 118 branches and seven computer centres and two payment transaction points (as at year-end 2002). Banks have the option of using the Deutsche Bundesbank's facilities instead of private giro networks or groups of banks.

Against the backdrop of the close connection between the implementation of monetary policy and the processing of payments through the central bank, the Bundesbank pays particular attention to the encouragement of large-value payments. These payments are processed through RTGS^{plus}, which at the same time provides a connection to the TARGET system. Together with the banking sector, the Deutsche Bundesbank developed this new liquidity-saving large-value euro payment system, combining the features of the two previous large-value payment systems, the Euro Link System (ELS) and the liquidity-saving hybrid system Euro Access Frankfurt (Elektronische Abrechnung Frankfurt; EAF), to form one single real-time gross settlement system, which can be used for both domestic and cross-border payments in euros. It went live on 5 November 2001. The EAF was closed at this time, whereas the ELS will still be operated mainly as a communication channel to RTGS^{plus} until the end of 2004. The new system is a means of gaining electronic access to the Deutsche Bundesbank, which has provided for this kind of access since 1990.

In addition, the Bundesbank also offers an electronic procedure intended specifically for the handling of mass payments (credit transfers, cheques and direct debits), namely the Retail Payment System (RPS).

(The principal features of the above-mentioned payment systems of the Deutsche Bundesbank are described in Section 3.)

Apart from operating national payment systems with a European linkage to TARGET, the Bundesbank also processes cross-border and cross-currency payments via AZV (Auslandszahlungsverkehr; Cross-border Payment Services). For this reason it holds bilateral accounts with credit institutions abroad. Since March 1995, banks have also been able to process incoming and outgoing cross-border payments via the correspondent banks of the Deutsche Bundesbank using data telecommunication and floppy disks. In Germany, cross-border payments are processed using the same technical components as those of the ELS. Additionally, the Deutsche Bundesbank provides the cross-border payment service MASSE, which is used for recurring payments especially on the part of the government to other countries, eg pension payments.

1.2.3 Settlement

A prerequisite for using the facilities offered by the Bundesbank for cashless payments is a current account with the Bundesbank.¹ The Bundesbank manages current accounts for banks and public authorities and, in exceptional cases - with a limited range of services - also for companies and private individuals. Apart from the minimum reserve balances, current accounts with the Deutsche Bundesbank do not bear interest and are run on a credit basis only. In accordance with the cover principle laid down in the BBankG, payment orders are only executed if sufficient cover is available.

In order to avoid a delay in the processing of payments in the course of the day, the current accounts may be overdrawn up to the amount of collateral existing within the framework of the marginal lending facility; in addition, cover for outgoing transfers may be provided through the crediting of credit notes for the collection of both cheques and direct debits.

¹ RTGS^{plus} remote participants only need an RTGS^{plus} account.

Debit balances at the end of a business day (resulting from intraday credit granted by the Deutsche Bundesbank) are not admissible and must therefore be settled by paying in the corresponding amounts using overnight facilities.

In addition to the settlement of payments processed through the Deutsche Bundesbank's payment systems, the accounts are also used for settling balances originating from clearing arrangements outside the Bundesbank, such as "bilateral clearing" (see also Section 1.3). Such settlement transactions are processed via RTGS^{plus}.

1.2.4 Pricing policy

Like all resolutions on business policy passed by the Deutsche Bundesbank, the principles for cashless payments are laid down by the Central Bank Council of the Deutsche Bundesbank to the extent set out in ECB Guidelines and Instructions.

Pricing is based on the cost covering principle. The Deutsche Bundesbank supports efficient procedures, for example by charging higher fees for the more complex exchange of data media than for submissions by data telecommunication. Non-banks are charged EUR 15 per month for account management (for further information on prices see Section 3). The current accounts of banks are managed free of charge.

Through its General Terms and Conditions of Business, its processing procedures, its debit and credit conditions and pricing, the central bank controls the extent to which its cashless payment systems are used. In addition, it exerts a certain influence on the terms and conditions applied by banks.

1.3 The role of other private and public institutions

In the Federal Republic of Germany, both banks and the Deutsche Bundesbank supply the economy and the public with cash and process cashless payments. At the end of 2001, banks maintained a total of 87.1 million current accounts for domestic non-banks. In addition, credit card companies process payments resulting from credit card transactions via their own networks.

Most of the 2,518 legally independent banks (with 52,737 branches as at the end of 2001, including 12,793 run by Deutsche Postbank AG) are actively involved in processing payments. Within the framework of the existing universal bank system, these banks belong, with a few exceptions, to one of the following three banking groups, each of which provides giro networks² specific to each group in the form of coordinated bilateral clearing and settlement arrangements:

- commercial banks, many of which have established important internal networks of their own;
- 534 savings banks, which form their own giro network together with their 13 central institutions; and
- 1,621 credit cooperatives, which form their own giro network together with their two central institutions.

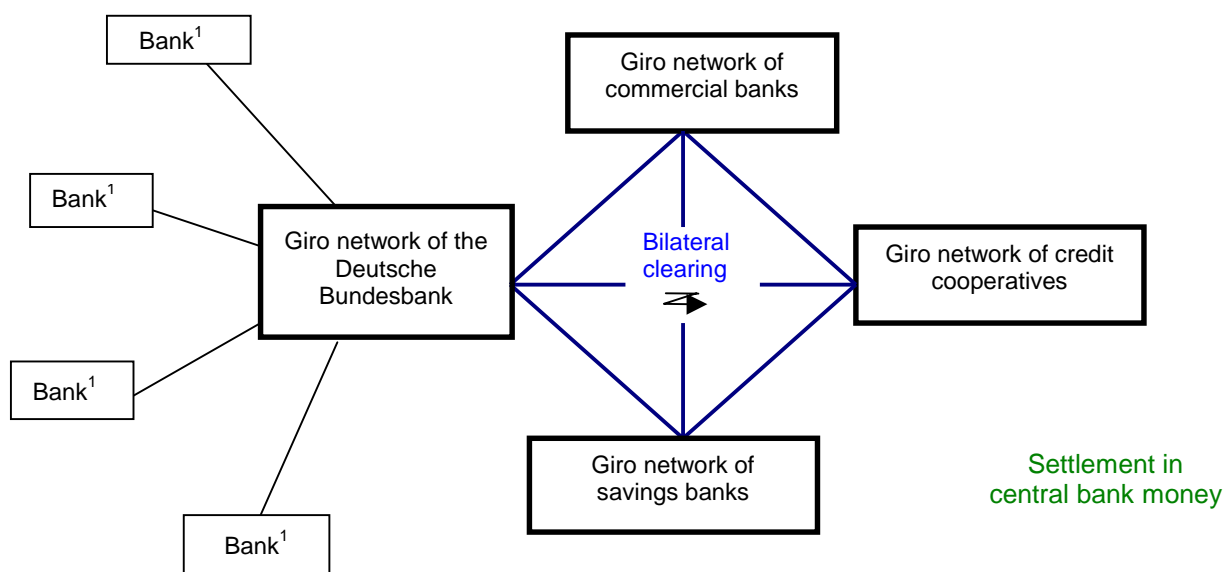
The Bundesbank is in practice the only means - other than relying on their competitors - for smaller private banks without a giro network of their own to execute payments intended for other banks on behalf of their customers.

Since 1982 a combined private national payment transaction company has existed for the German banking sector, Gesellschaft für Zahlungssysteme mbH (GZS). This is an independent processing company which ensures the low-cost handling of card-protected payments and develops new electronic payment systems. The main card systems involved are Eurocard, Visa and debit card systems. GZS customers are banks and trading firms, with commercial banks and savings banks each holding 40%, and cooperative banks 20%, of the company's equity capital.

² The term "giro network" refers to payment procedures which are used within one banking group or within a bank's branch network. Settlements are effected by one or more of the banking group's central institutions.

Giro networks in the Federal Republic of Germany

(for credit transfers, cheques and direct debits)



Note: This diagram provides only an overview of the connections between the various giro networks. Not all bilateral relationships are shown.

¹ Banks without a giro network of their own and/or not using private giro networks.

2. Payment media used by non-banks

2.1 Cash payments

The euro is the German currency and was introduced on 1 January 1999. At that time it only existed as book money or as electronically stored units of value, with banknotes and coins continuing to be denominated in DEM. After its introduction as cash on 1 January 2002 the euro became the only legal payment medium in Germany; nevertheless, the DEM, which was the only legal payment medium until then, could still be used until the end of February 2002 according to an agreement between the Deutsche Bundesbank, the ZKA and the German retailer association. The German banknotes and coins in circulation could be exchanged cost-free at banks at least until this date; thereafter the Deutsche Bundesbank guarantees the exchange of DEM to the new currency. Banknotes are available in seven denominations (EUR 5, 10, 20, 50, 100, 200 and 500) and the coins in eight (1, 2, 5, 10, 20 and 50 cents and EUR 1 and 2). The German 1, 2 and 5 cent coins have an oak leaf on the back, the other cent coins a picture of the Brandenburger Tor in Berlin, and the euro coins the eagle as the German heraldic animal. In addition, there are very small quantities of DEM 10 coins, although these are primarily for collectors and therefore rarely used in payment transactions. Banknotes and coins are legal tender, although there is no obligation to accept more than 50 coins, or in the case of commemorative coins no more than EUR 100. At the end of 2001 total currency in circulation - including cash in bank vaults - amounted to EUR 82.9 billion, of which EUR 76.5 billion was in banknotes (92.3%) and EUR 6.4 billion in coins (7.3%). Cash in bank vaults amounted to EUR 14.9 billion.

Although the share of card-based payments is rising continuously, cash payments still amounted to 68.8% of the value of all retail payments in 2001.

2.2 Non-cash payments

In Germany, cashless payments are effected by means of credit transfers (49.8% of the total number of cashless payment transactions in 2001), cheques (2.3%) and direct debits (36.4%). The usage of

debit and credit cards is steadily increasing, reaching in total a share of almost 11.3%. Other types of payment, such as special payment instructions via Deutsche Postbank AG, but also payments made with prepaid cards, are relatively insignificant (less than 1%).

2.2.1 Credit transfers

In Germany, credit transfers have traditionally been the predominant form of payment transaction. However, their share of the total volume of payment transactions has decreased in recent years because more suitable payment instruments, especially direct debits, are being used for certain purposes (eg for the collection of identical payments due on a regular basis).

For payments recurring on a regular basis (eg rent payments) the bank customer also has the possibility of giving his bank instructions to set up a standing order; this bank is then responsible for monitoring the timely execution of transfers (eg on the last day of the month).

Those customers who instruct their bank to make periodically recurring retail payments (eg salaries, wages, social benefits) are requested to submit their orders to the banks via electronic data media (magnetic tape or diskette). Increasingly, these payments are now being handled via data telecommunication, not only between banks but also between banks and their customers.

In 2001, as many as 7.0 billion credit transfers were processed by the German banking industry. 460.1 million of them were submitted via PC or terminal from customers to their bank. As the number of internet-linked accounts increases in Germany as well as customer acceptance of using the modern communication infrastructure for accessing their banks, this number is expected to increase further.

According to the Credit Transfer Agreement between the central associations of the German banking industry and the Deutsche Bundesbank, every credit transfer has to be processed in a fully automated and paperless form in interbank clearing and settlement by credit institutions. Thus, accepting institutions have the obligation to convert credit transfers from a paper-based to a paperless form.

2.2.2 Cheques

In Germany, the cheque has never become as important as it has in many other countries of the western world. In terms of numbers it accounts for a mere 1.3% of all cashless transactions, in terms of value just 2.7%. It is used for only 0.1% of all payments at retailers. On account of the increase in more efficient debit card payments, the importance of the cheque is steadily decreasing. A further decline in cheque payments in retail business can be expected as the eurocheque guarantee ceased at the end of the year 2001. Although the number and value of cheques have declined in the past years, they are nevertheless still active in business life.

Under the German Cheques Act, the drawee bank may not certify a cheque in such a way as to signify that it undertakes to honour it. The purpose of this prohibition is to prevent cheques acquiring a function similar to that of banknotes. An exception is made for "certified cheques", which are drawn on the Deutsche Bundesbank. On request by an issuer with sufficient cover, the Bundesbank will certify such cheques. The liability arising from the certification lapses if the cheque is not presented for payment within eight days of the date upon which it is drawn.

With the automation of cashless payment transactions, the fact that a cheque is a payment instrument which is payable at sight has proved to be one of its key disadvantages. In other words, cheques must always be collected and presented in paper-based form. In 1985, the central associations of the German banking industry and the Deutsche Bundesbank agreed on a paperless cheque collection procedure (formerly called the BSE Agreement, now part of the Cheque Agreement), while deliberately waiving the statutory obligation to physically present cheques. The handling of BSE cheques (since 2002 cheques below EUR 3,000) is fully automated and, in interbank transactions, entirely electronic, whereas GSE cheques (large-value cheques for amounts of EUR 3,000 or more since 2002) are still physically presented to the drawee banks.

2.2.3 Direct debits

The direct debit, introduced by the banking industry in 1963, has considerably simplified the collection of periodically payable monetary claims (subscriptions, fees, taxes, etc). Today around 36.4% of all cashless payments of non-banks in Germany are effected by direct debit. Its relative importance

compared with other payment instruments is increasing, especially as debit card payments (another 8.7%) are processed as direct debits as well.

Unlike credit transfers, direct debits are initiated by the payee, which thereby ensures that its claim on the payer is fulfilled on time. However, this presupposes that the payer preauthorises the payee to collect payment (collection authorisation) or, by agreement with the payee, authorises its bank to debit its account in accordance with direct debit requests issued by that particular payee (debit authorisation).

Bank customers who have IT systems are expected to submit their direct debits for collection to the bank in electronic form only, ie on magnetic tape or diskette. Any remaining direct debits which are still paper-based - collection of this kind is quite expensive for bank customers - are converted into data records by the first-collecting institution, eg by means of inputting via terminals or scanning systems. In November 1993, the direct debit became the first payment instrument to be fully automated as part of the general conversion obligation introduced on the basis of the Direct Debit Agreement, and since then it has been handled in wholly paperless form in interbank transactions.

2.2.4 Card payments

The use of cards for retail payments is increasing steadily. Debit card payments account for 21.2% (electronic cash 5.4%, electronic direct debit system (ELV) 11.9%, and point of sale without payment guarantee (POZ) 3.9%), credit cards for 4.5% and retailer cards for 1.4% of the total value of retail payments.

2.2.4.1 Debit cards

Payment cards in the form of debit cards are usually issued by banks as bank cards with which customers may also draw on their account balances outside their bank (eg cashless payments at automatic cashpoints, withdrawals at cash dispensers).

Bank cards as payment cards have evolved since their introduction as guarantee cards for eurocheques (ec cards) and their main function today is for electronic payments at payment terminals. With the rapid growth of card payments at payment terminals in shops, etc, the banking sector has also added the payment function to another kind of card issued by a bank or banking association itself in order to provide customers who could not obtain an ec card, for example on account of their credit rating, with a means of accessing electronic self-service media. The number of these cards which can be used at payment terminals grew rapidly in the past decade and today the majority have a payment function. With the abolishment of the eurocheque guarantee there is no longer a difference between the two kinds of bank cards.

In the recent past many card issuers have extended the range of tools available on debit cards. A chip on the card makes offline authorisation of guaranteed card payments possible. In addition, bank cards can be used as prepaid cards (the GeldKarte system of the ZKA).

As a consequence of the merger between the Europe-wide edc (European debit card) service and the worldwide Maestro system, since the beginning of 1998 many POS terminals and cash dispensers throughout the world have been available to holders of ec cards with the Maestro logo.

Recently, debit cards have been issued as Visa cards using the infrastructure provided by Visa. So far these Visa debit cards are not as widespread as bank cards.

No special system exists for the clearing and settlement of debit card transactions with bank cards. These payments are handled like direct debits.

The usage of debit cards for guaranteed payments and withdrawals is usually limited according to varying restrictions of the card-issuing institution. The limitation is usually weekly, including all tools and with various sub-limits for every tool, eg a limit for cash withdrawals per day.

Electronic cash

After many years of negotiations, the banking sector concluded the agreement on an interbank system of cashless payment at automatic cashpoints (electronic cash system) in February 1990. This makes it possible to have a uniform POS system on the basis of debit cards. Under this system cardholders can pay for goods and services by debiting their accounts at the corresponding acceptance points using cards issued by the German banking sector (ec card and bank customer card) and the

matching, confidential PIN. Once customers have entered their PIN, an authorisation request is directed to the authorisation centre through the network operator. The authorisation centre checks the confidential number, the credit balance and/or credit line and the entries in a blocking file. If the answer is positive, the card-issuing bank gives a payment guarantee for the amount requested. A charge is levied on merchants for these transactions.

The terminal networks of the various and competing network operators (of which there were 30 at year-end 2001) are connected to the banking industry's centres for the authorisation of electronic payment by debit card in the electronic cash system. By the end of 2001, following a continuous increase, about 306,000 electronic cash terminals had been installed (including electronic cash offline) - mainly in petrol stations and retail outlets.

Due to the fact that bank cards will become more and more alike, the retailer's risk of rejection of card payments by banks will increase as retailers will no longer be able to distinguish the creditworthiness of their customers, if the retailers use debit card systems other than the electronic cash system. For this reason, the banking industry expects a further increase in the usage of electronic cash.

Electronic cash offline

This system, designed in cooperation with the banking industry, is based on chipcard technology and corresponds to the electronic cash system above. The only difference is the possibility of offline authorisation. An authorisation up to a certain limit laid down individually by the issuing bank is stored on the bank card's chip. This amount decreases with each payment and, as long as the remaining amount is sufficient, transactions are authorised offline. In order to pay, the customers must enter their PIN, which is validated on the chip. Online authorisation will only take place if the amount remaining on the chip is no longer sufficient or if more than 90 days have elapsed since the last online authorisation. The fees paid to the banking industry are the same as the charges above, although in 80% of cases the retailer saves telecommunication costs through offline handling.

Electronic direct debit system

The retail trade has developed a system (without consulting the banking sector) which makes payments by bank card possible without any authorisation. This system is known as the electronic direct debit system (ELV). The customer's signature on the receipt or an additional document authorises the dealer to collect the cost of the purchase by direct debit. However, the risks of a direct debit being returned on account of an objection or lack of cover, or possibly because the card has been blocked, are borne solely by the retail outlet. This means that there is no payment guarantee in this system and no extra charges are incurred. So far the risk of payment failures could be minimised because of the distinction of ec and other bank cards which gave some information about the customer's creditworthiness. Because this distinction no longer exists, the proportion of ELV payments is expected to decrease in the future in favour of electronic cash payments. The electronic direct debit system is the most frequently used card-based payment system in Germany at the moment.

Point of sale without payment guarantee

In response to the success of the ELV procedure, the banking sector introduced a further system of electronic payment using the ec card at cash terminals in addition to the electronic cash procedure. In this alternative procedure, the customer signs a debit note produced using data from the magnetic stripe. In this system the banks do not give a payment guarantee, with the result that the retailer alone bears the risk. This POS system provides retailers with a simple and inexpensive payment system without the need to enter a PIN and with a simple, fee-based online blocking check for amounts of EUR 30.68 or above.

2.2.4.2 Credit cards

The use of credit cards³ has increased in the past few years but not as significantly as the usage of debit cards. The number of cards issued by the major card organisations (American Express, Diners

³ In Germany, the term Kreditkarte is used for both charge cards and credit cards. Most of the cards referred to as "credit cards" in this book offer no possibility of obtaining credit. Periodical unit invoices have to be settled immediately on receipt. Thus, these cards are generally designated as deferred charge cards.

Club, Eurocard in connection with MasterCard, Visa) has grown from approximately 10 million at the end of 1994 to more than 18.8 million at the end of 2001. At the same time, the number of acceptance points (especially in the retail sector and the hotel business) has increased substantially. In 2001, German cardholders made payments by credit card amounting to approximately EUR 37.2 billion. In spite of this, credit cards are still used far less than other payment instruments (eg debit cards) in the Federal Republic of Germany.

Owing to the commission charges (a deduction from the credit card turnover of the acceptor, which is payable by the latter only) and the amount of work involved in the authorisation and processing of payments, credit cards are not always popular in the retail trade. Thus their use tends to be restricted to more "upmarket" retail outlets. In addition, the ec card and customer cards issued by banks provide retailers with a less expensive payment option.

Whereas GZS issued the Eurocard credit card on behalf of banks until 1989, banks now have the possibility of issuing them themselves. More and more banks now also issue Visa cards. This means that banks and credit card organisations are increasingly competing with each other. Banks use credit cards to a greater degree for cross-selling or for developing customer relationships. Various additional services (eg insurance) and bonus programmes (eg card charges depending on purchase amounts) are aimed at achieving greater customer loyalty and increased card use.

2.2.4.3 Retail cards

Retail cards with a payment function, which are issued by some major stores with the aim of increasing customer loyalty, are now competing with traditional credit and debit cards. With the largest issuer in Germany, for example, the use of retailer cards is free of charge. Cardholders can usually take advantage of a payment period of between one and two months or pay in instalments. At the end of 2001 there were around 12.6 million retailer cards with payment functions in circulation. Retailer cards provide the retail trade with exact information on customer and purchasing profiles.

2.2.4.4 Prepaid cards

At the end of 1996 the first prepaid cards were issued in Germany by the German banking sector (ZKA-GeldKarte-System) and tested in a pilot project. Since the successful test phase the number of prepaid GeldKarte cards has increased to 67.3 million. There are cards linked to accounts, where the GeldKarte chip is integrated into an ec card, as well as cards not linked to an account ("white cards"), which have only an electronic purse function. The potential of these more than 67 million chipcards with the GeldKarte feature has not yet greatly developed due to lack of acceptance from suppliers of goods and services and customers, even though the number of transactions is increasing steadily and has reached more than 30 million per year. The average value per transaction has decreased to about EUR 2, showing that the aim of usage for low-value payments is being achieved. In addition to the GeldKarte system developed by the ZKA, there were other prepaid cards which, however, were relatively insignificant and unsuccessful and subsequently discontinued their operations.

2.2.4.5 Cash dispensers

In Germany, banks offer both their own customers and the customers of other banks the possibility of obtaining cash up to a certain limit from approximately 49,620 cash dispensers nationwide (as at the end of 2001) using bank, other debit or credit cards in combination with a PIN. Credit cards can also be used at cash dispensers. For all transactions at cash dispensers an online connection to the authorisation centre of the bank concerned is established and a block and limit check is made in order to prevent fraudulent or other inadmissible withdrawals. Settlement of transactions at cash dispensers is effected by direct debit.

2.2.5 Post office services

Deutsche Postbank AG is a privatised company offering both payment services and other services through its own branches and through post offices. In addition to handling credit transfer, cheque and direct debit transactions, Deutsche Postbank AG offers its customers the possibility of sending sums of money to the home of the payee by means of a payment instruction specific to this institution.

3. Interbank exchange and settlement systems

3.1 General overview

In Germany many of the commercial banks, savings banks and cooperative banks operate their own giro networks. In addition, the Deutsche Bundesbank runs its own payment systems, which are neutral in their effect on competition and available to all banks. In contrast to a payment system, a giro network has no system owner and there are no governance arrangements. Nevertheless, as in payment systems credit transfers, direct debits and cheques are cleared solely as electronic data using the same data record standards and common procedures which allow full straight through processing by the intermediary and the receiving banks.

The giro networks of the savings and credit cooperative banks are based on bilateral agreements between the banks of the respective banking groups using the agreed standards (domestic loro/nostro arrangements), whereas the giro networks of the commercial banks can nowadays be regarded as "internal networks". The networks have evolved over several years with the aim, on the one hand, of processing payments cost-efficiently and, on the other, of keeping the liquidity within the credit institution or at least the banking groups as long as possible.

Giro network of commercial banks

The four big banks and the Deutsche Postbank are the main participants in the giro networks of the commercial banks. Each of these banks operates an internal network of its own to process payments; this network is based on its branches or subsidiaries. The head office, the branch offices and/or, in some cases, subsidiaries are linked to special processing entities (service providers) or computer centres which process the transactions and carry out the accounting. Settlement in the internal giro network of a commercial bank takes place in commercial bank money in the books held at its headquarters.

Giro network of savings banks

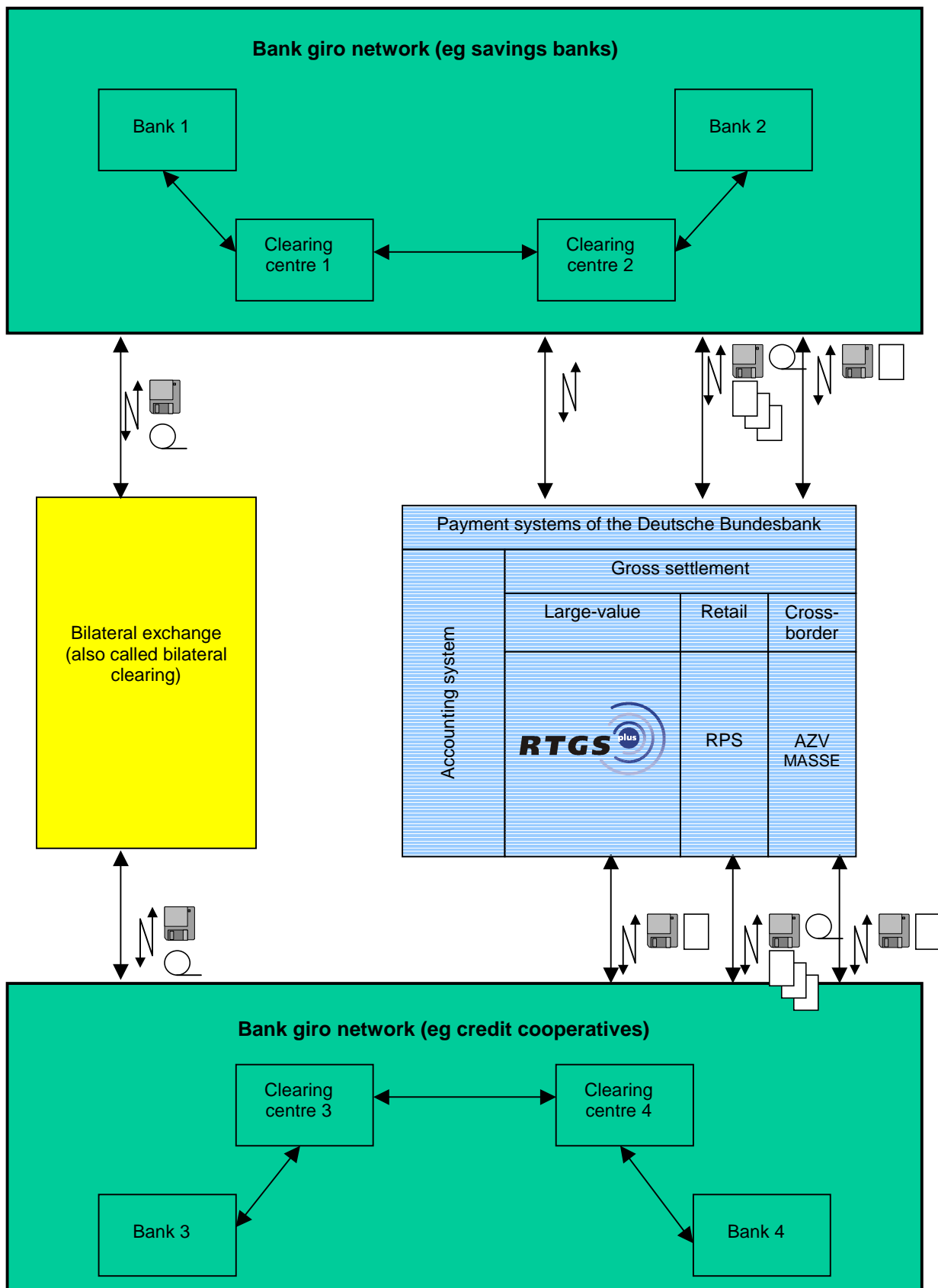
The giro network of the savings banks consists of about 530 savings banks, the Landesbanken and the central institution, DGZ DekaBank. Each savings bank maintains an account with its "regional"⁴ Landesbank (previously known as a "regional giro institution") for the purpose of exchanging payments. However, most savings banks also have direct access to the Bundesbank's payment systems via a clearing account of their own. In general, the payments are processed in special computer centres. Net positions resulting from the exchange of payments are transferred to the central institutions which then credit or debit the settlement accounts of each savings bank. The Landesbanken maintain settlement accounts for each other for the purpose of payment transfer, ie commercial bank money is used to settle on a regional basis with savings banks and nationally among Landesbanken. Cross-network payments are exchanged and cleared either bilaterally or via the Bundesbank, where settlement is always based on central bank money. It can also be assumed that urgent payments are always made via the Bundesbank's RTGS^{plus} system outside the giro network of the savings banks, since this banking group has made a commercial decision to this effect.

Giro network of credit cooperatives

The credit cooperatives sector also operates a giro network. This includes about 1,800 credit cooperative banks in Germany, one regional institution, the WGZ-Bank (Westdeutsche Genossenschafts-Zentralbank eG) and the central institution DZ Bank (Deutsche Zentral-Genossenschaftsbank). The technical processing of payments is carried out using a very similar approach to that of the savings banks.

⁴ With a few exceptions, there is one central institution per federal state in Germany.

Interbank funds transfers in Germany



RPS = Retail Payment System of the Deutsche Bundesbank.

AZV = Cross-border payments procedure (via correspondent banks) of the Deutsche Bundesbank.

All banks directly involved in payment transactions are identified either by eight digit bank sort codes (BLZ) or by their bank identifier codes (BIC codes). Branches of banks either have their own BLZ or a BLZ derived from that of their parent institution. The bank sort code is also the current account number with the Deutsche Bundesbank. Additionally, in the Bundesbank's new large-value system RTGS^{plus} (see Section 3.2), which is based on SWIFT standards for data formats, banks are addressed solely with BIC codes.

The following provisions apply to all systems operated by the Deutsche Bundesbank: the general provisions of the German Civil Code, the German Commercial Code, the Act governing General Terms and Conditions of Business (Gesetz über die Allgemeinen Geschäftsbedingungen), the General Terms and Conditions of Business of the Deutsche Bundesbank and the various payment agreements concluded between the banking industry and the Deutsche Bundesbank.

3.2 RTGS^{plus}

3.2.1 General overview

With the launch of the euro on 1 January 1999, the European payments scene underwent a substantial change, necessitating a reorientation of the range of large-value payment services offered by the Deutsche Bundesbank. In these circumstances, a consolidation of the two former large-value systems of the Bundesbank, the RTGS Euro Link System (ELS) and the hybrid system Euro Access Frankfurt (EAF) appeared necessary to improve the cost situation and to benefit from synergies. Moreover, recent developments in the area of communication technology as well as additional requirements, especially on the part of larger banks, called for a modernisation of the Deutsche Bundesbank's large-value payment systems of that time. For example, the need for comfortable and effective intraday liquidity management has become more and more important. For these reasons, between 1999 and 2001 the Bundesbank created RTGS^{plus}, an integrated, liquidity-saving real-time gross settlement system. RTGS^{plus} is also the German component within the TARGET system of EU central banks. The technical concept behind RTGS^{plus}, which was drawn up in close cooperation with banks, has the following main features:

- *European orientation through open access and use of domestic liquidity*

The system is open to all credit institutions and investment firms registered in the EEA. Moreover, RTGS^{plus} keeps its own intraday accounts for settling payments. There are various flexible options for the provision of liquidity to and the withdrawal of liquidity from these RTGS^{plus} accounts ("liquidity bridge").
- *Gross system with liquidity-saving elements*

The integration of liquidity-saving elements into the gross settlement procedure of an RTGS system makes it possible for the customer to individually organise payment processing from the point of view of throughput and liquidity savings.
- *Payment system with extensive options for controlling liquidity*

Every participant in RTGS^{plus} can precisely control the use of the liquidity it makes available in accordance with its needs.
- *Online information and interactive control*

RTGS^{plus} offers comprehensive real-time information and makes it possible to change all control parameters using modern internet technology with its information and control system (ICS).
- *Use of SWIFT standards and services*

RTGS^{plus} uses internationally established SWIFT standards for data formats and payment exchange. Moreover, the new, forward-looking SWIFTNet services, based on the latest internet technology, are used for online information and interactive control.

RTGS^{plus} went live on 5 November 2001; on this date the EAF was closed down. On an average working day in December 2002, RTGS^{plus} processed more than 117,000 domestic payments and more than 17,000 cross-border TARGET payments; average turnover is about EUR 400 billion.

Customers who do not yet participate in RTGS^{plus} can continue to use the ELS, albeit as a procedure for gaining access to the Deutsche Bundesbank's large-value payment system. However, for the Bundesbank as the operator and for banks as users it would be uneconomical to operate the ELS as a parallel system in the long term. Thus, the ELS will be closed down within a further three-year period at the latest. The Bundesbank undertakes to find a way for all ELS users to participate in RTGS^{plus} in a cost-effective way by the time the ELS closes down.

3.2.2 Participants

In order to ensure that access to RTGS^{plus} is as open as possible, the Bundesbank has dispensed with size-dependent criteria for participation in the system. It is possible to address about 8,400 credit institutions as direct or indirect participants (including branches of participants).

Only credit institutions and investment firms may participate directly in RTGS^{plus}. As at year-end 2002 there were 74 direct participants. The European central depository Clearstream and the futures exchange Eurex will also be linked to RTGS^{plus} for their cash settlement.

Banks may participate indirectly. In this case, clearing will be carried out via the selected direct RTGS^{plus} participant, which is either a credit institution or the Deutsche Bundesbank. Users participating via the Deutsche Bundesbank will use the ELS as their linkage to RTGS^{plus} until it closes in November 2004 at the latest.

3.2.3 Types of transaction handled

RTGS^{plus} is a system for credit transfers in euros. Domestic and cross-border TARGET instructions may be submitted, as required, in the form of either express or limit payments. In addition, RTGS^{plus} offers the possibility of submitting orders as timed payments.

Express payments

For express payments the participant uses their complete RTGS^{plus} liquidity. The express mode is therefore especially suitable for priority payments, eg time-critical and settlement payments.

Limit payments

Alternatively, the participant may systemically control the outward flow of liquidity by defining limits and submitting orders as limit payments. Such payments are only executed if the current credit balance in RTGS^{plus} is sufficient and the maximum amount of liquidity the sender is willing to use for limit payments has not been exceeded.

TARGET payments

RTGS^{plus} is the German access point to the TARGET system of the EU central banks. With the integration of the German TARGET component into RTGS^{plus}, its service quality has much improved and thus contributes to a more efficient liquidity flow in TARGET. TARGET payments may also be submitted as limit payments.

Timed payments

Participants can tag time-critical payments ("till" payments) with a due time. Nevertheless, the RTGS^{plus} participant is still responsible for the punctual execution of the payment. But the ICS enables simple and continuous monitoring via selective access to these instructions and provides a special warning feature. In RTGS^{plus} it is also possible to set up "from" payments. The participant defines the earliest processing time of the payment.

Banks make use of RTGS^{plus} on the one hand for interbank operations, such as money market transactions and liquidity management operations. On the other hand, due to its speed, its liquidity efficiency and favourable pricing, RTGS^{plus} is widely used for urgent customer payments (share of 60% in terms of volume).

3.2.4 Transaction processing environment and liquidity control parameters

RTGS^{plus} has the advantages of real-time gross settlement systems, which are the efficient and immediate processing of payments and the immediate finality of credit bookings in central bank money. However, the new system not only processes all incoming payments quickly and securely, but also handles them in such a way as to enhance liquidity with its efficient algorithms. In this way, the system combines uniquely the elements of gross, net and hybrid systems evading credit and liquidity risks.

RTGS^{plus} intraday accounts

RTGS^{plus} holds its own intraday liquidity. Therefore direct participants transfer liquidity from their home account, which may be held at a central bank or a credit institution within the euro area, to their RTGS^{plus} account in the morning. At the end of the day, the remaining liquidity is transferred back to their specified account. During the day, liquidity can easily be transferred between RTGS^{plus} and the respective home account. This structure allows, for example, comfortable participation of foreign customers by means of remote access. Liquidity transfers may be initiated by means of the ICS and are effected via the Bundesbank or via TARGET. Customers holding an account at the Deutsche Bundesbank may also set up a standing order via the ICS for the liquidity injection in the morning.

Liquidity-saving elements

The liquidity-saving processing of RTGS^{plus} is achieved by various coordinated mechanisms. These consist mainly in three measures: immediate real-time settlement, but with consideration of mutual cover dependencies for both express and limit payments, event-oriented optimisation of the express queue and ongoing resolution of the queues through sophisticated, differentiated algorithms with comprehensive consideration of offsetting transactions, which enables efficient payment processing with strong liquidity-saving effects. The algorithms lead to minimised queues and improved throughput as well as accelerated settlement with early finality due to the efficient use of the available liquidity. This allows participants to optimise their collateral deposits.

Limit control

Limits are the most important means of managing liquidity in RTGS^{plus}. By preventing unilateral losses of liquidity, sender limits ensure that - beyond a certain threshold - RTGS^{plus} participants can only receive final payments if they are ready to submit payments themselves ("payment versus payment philosophy"). Moreover, experience shows that sender limits encourage early submission of payments and help to synchronise payment flows. The participants have flexible options for controlling their liquidity. If they do not require any control at all, they can dispense with the use of limits entirely. The next level of control is to define a total limit. This restricts the use of liquidity available for limits as a whole and reserves the liquidity above for express payments. Additionally, fine control of liquidity can be achieved by defining bilateral sender limits, which is participant-related, and multilateral sender limits for other participants not being defined bilaterally.

Interactive information and control system (ICS)

Nowadays the flow of information is assuming central importance. For this reason RTGS^{plus} provides the ICS. By means of dynamic, rapid and comprehensive online provision of information the participants can monitor their liquidity position at all times and are able to plan it in a far-sighted manner. All essential RTGS^{plus} information can be called up in real-time, in a transaction-oriented and interactive way. The participants can call up their liquidity position in RTGS^{plus} and, if available, for their Bundesbank home account. They have targeted access both to detailed information on any RTGS^{plus} payment and to accumulated payment information, eg incoming and outgoing payment queues. The system also provides messages on current status and general information. Participants can control their payment processing according to their needs and circumstances at any given time. All essential action parameters can be changed interactively, as long as the payment is not final, like limits, the position of payments in the queues, the processing type (express or limit payments), the setting of execution times ("from" and "till" payments) or the revocation of payments. The ICS is also used for liquidity transfers from the RTGS^{plus} account to the home account and, if the participant has a home account at the Bundesbank, from the home account to the RTGS^{plus} account. Moreover, the ICS is equipped with a backup functionality. This permits participants to send important liquidity transfers to other RTGS^{plus} participants even if there are problems in the internal systems of the sender.

Euro Link System (ELS)

The ELS was the German RTGS system before RTGS^{plus} went live. Now it is the entry point for banks in RTGS^{plus} as indirect participants via the Bundesbank during a transitional period which will last no longer than three years in total. The ELS operates from the high-availability computer centre (HVRZ) in Düsseldorf. RTGS^{plus} payments, which are always rapid Prior1 payments executed immediately if sufficient cover is available, are processed via the Bundesbank converter to RTGS^{plus}. Additionally, if a payment in RTGS^{plus} is addressed to an ELS bank the Bundesbank forwards this payment to the receiving bank as an ELS Prior1 payment. Cross-border TARGET payments are always processed via RTGS^{plus}.

3.2.5 Operation of the transfer system

The communication infrastructure of RTGS^{plus} is geared to SWIFT services. The system accommodates the demand for secure, modern and international routes of access by exclusively following SWIFT standards. That allows for a rapid connection to RTGS^{plus} and the realisation of considerable synergy effects due to the fact that SWIFT interfaces are already employed in many banks. Foreign banks can thus easily participate in RTGS^{plus}.

Payments are processed using the FIN Y-copy service, developed by SWIFT especially for real-time gross settlement systems. RTGS^{plus} customers can use the innovative, particularly secure SWIFTNet Services, offering a high level of availability and ensuring a comprehensive supply of information and active control in real time. They can use a fully automated exchange of information between their back offices based on XML message types via SWIFTNet InterAct or have a dialogue-oriented access to all relevant RTGS^{plus} data via SWIFTNet InterAct Browse. Customers who do not wish to use SWIFTNet Services may communicate through a worldwide virtual private network (VPN).

RTGS^{plus} is friendly to straight through processing (STP) in many respects. It uses SWIFT data record formats and thus provides the basis for totally automated payment processing. RTGS^{plus} supports STP features like the SWIFT message type MT103+ and high standards regarding the quality of data. At the end of the day participants receive message types MT940/950, which enables them to automatically balance the payments cleared on that particular day against the payments entered in their internal processing systems.

RTGS^{plus} offers a high degree of availability and reliability by using the latest technology and a high degree of backup provision. RTGS^{plus} operates from the HVRZ in Frankfurt.

3.2.6 Credit and liquidity risk

RTGS^{plus} is the first system to overcome the barrier between gross and net settlement systems and integrates the advantages of both environments into a unique system. RTGS^{plus} accounts, which are run on a credit basis only, are the basis for any transaction processed in the system. All payments are characterised by secure processing in central bank money with early finality, which is typical of real-time gross systems. Payment instructions are handled immediately and checked for cover. If there is sufficient liquidity available, the payment is settled and central bank money transferred simultaneously and immediately. If not, the payment order will be placed in a queue. The credit booking to the RTGS^{plus} account of the recipient is final and irrevocable right away and the funds are available for disposal without any further restrictions. For this reason, RTGS^{plus} does not create any settlement, credit or liquidity risk. In contrast to other RTGS systems, the usage of offsetting payments as additional cover in RTGS^{plus} facilitates payment processing and reduces liquidity needs. Moreover, smooth and fair behaviour among the participants is supported by the liquidity management features provided in RTGS^{plus}.

3.2.7 Pricing

Only transaction fees fully recovering the costs are charged in RTGS^{plus}, ie there are no entry fees or periodical fixed fees. The price model takes the interest of both large and small banks into account. Participants with a low number of transactions profit from a favourable, transparent transaction price, being valid for all participants, whereas banks with larger volumes benefit from a scaled discount system:

Submission per month	Transaction fees
For the first 4,000 orders	EUR 0.24
For the following 16,000 orders	EUR 0.22
For the following 40,000 orders	EUR 0.205
For the following 40,000 orders	EUR 0.19
For orders beyond that	EUR 0.17

3.3 The retail payment system RPS

3.3.1 General overview

The electronic RPS is used both for the routing of credit transfers and for the collection of cheques and direct debits. Banks and other Deutsche Bundesbank account holders (eg public authorities) can participate in the RPS. As a matter of principle, orders must be presented by banks in paperless form. Cheques for amounts of EUR 3,000 or above (so-called "GSE" cheques) are an exception to this rule. In general, retail payments without a need for priority treatment are submitted to the RPS and are batch-processed "overnight". Incoming and outgoing payments can be handled both on electronic media (magnetic tapes or diskettes) and, since 17 March 2000, via data telecommunication. In 2002, the share of payments processed via telecommunication reached more than 50%. The processing time for RPS payments within the giro network of the Deutsche Bundesbank is one working day. Since 5 February 1999, the booking of entries of credit transfers to the accounts of the submitter and of the receiving credit institution has been effected on the business day after submission; the RPS is therefore float-free - as has already been the case in the Deutsche Bundesbank's collection procedures for some years. The RPS is based on a number of agreements between the central associations of the banking industry and the Deutsche Bundesbank. The content of these agreements relates both to technical requirements and to certain conversion requirements.

In addition to the General Terms and Conditions of Business of the Deutsche Bundesbank, both the "Special terms of the Deutsche Bundesbank for the Retail Payment System" (RPS conditions) and the "Special terms and conditions of the Deutsche Bundesbank governing electronic order placing, data transmission and account information" (EADK conditions) are applicable with regard to clearing in the RPS procedure; moreover, remote access is subject to the "External specifications for electronic access to the Deutsche Bundesbank".

3.3.2 Participants

Each credit institution with an account at a Deutsche Bundesbank branch which meets the technical requirements of the RPS is entitled to submit credit transfers or cheques and direct debits to the Bundesbank on electronic media or by data telecommunication (cf the special case of the GSE above). The branches and the Central Office of the Deutsche Bundesbank use this system to execute orders of their customers (eg public authorities) by paperless transfer.

3.3.3 Types of transaction

The RPS is utilised to process paperless credit transfers and direct debits of any value. By contrast, cheque truncation items (BSE cheques) can only be submitted if their face value is below EUR 3,000 and if they meet special formal requirements. In this case, they are collected on a paperless basis and without presentation of the original cheques to the drawee credit institution, as laid down in the Agreement on the collection of cheques within the German banking industry. In principle, these cheque data need to be recorded by the first collecting institution. However, the conversion can also be effected by a bank instructed or commissioned to do so by the first collecting institution. The first collecting institution is obliged to examine the cheques to establish their compliance with formal and legal requirements. Cheques that are formally incorrect must be collected within the GSE procedure. GSE cheques, ie cheques with a value of EUR 3,000 or more, and other collection papers not capable of being processed within the BSE procedure are transformed into data records, too, and are collected

via the RPS. In addition, all GSE vouchers are presented physically to the drawee credit institution. The conversion of cheques for the GSE procedure is performed exclusively at the Bundesbank's computer centres and payment transaction points.

3.3.4 Processing environment

The payments are channelled to the central multiple virtual storage (MVS) application (at an HVRZ) via decentralised input/output stations in the regional computer centres. The payments converted in the branches of the Bundesbank using the data input and output (DEA) systems are channelled directly to the central MVS application, where the incoming and outgoing payments by data telecommunication are processed and then executed directly via a central gateway.

The electronic data media (EDM) and GSE cheques must be submitted to the Deutsche Bundesbank branches by 2.30 pm or, in the case of direct submissions, to the relevant regional computer centre by 6.30 pm. Submissions by remote data telecommunication must be concluded either by 8 pm in the case of credit transfer files or 9 pm in the case of direct debits and/or BSE items. Banks have the possibility of joining a service centre or clearing institution and having their submissions and deliveries effected by this institution; in such cases the payments will be settled via the clearing institution. The EDM are read in at the computer centres and routed to the central MVS application. This is where the actual data processing, ie the sorting of payment orders, takes place. After processing, the computer centres receive pre-sorted files to be forwarded via EDM exchange to the recipient credit or clearing institution, or to the recipient branches of the Deutsche Bundesbank. Participants using remote data communication are supplied with the files directly by the MVS application using a central gateway interface.

Credit transfers are executed on a gross cumulative basis, with sufficient cover being a vital condition for execution. On the date of submission the level of cover required is ascertained by blocking an amount equivalent in value to the payment orders submitted in the submitter's current account. The following business day, the account of the submitting bank is debited and the blocked funds are released. The value of cheques and direct debits is credited on the business day following submission ("subject to collection") and is also settled on a gross cumulative basis. Crediting and debiting of accounts always takes place at the same time on the working day after submission.

3.3.5 Credit and liquidity risk

Since each (single or collective) payment is booked on a gross basis and revocation of the transaction with the Deutsche Bundesbank is no longer possible once automatic processing has been launched, there is no credit risk - and generally no liquidity risk - for the recipient bank. The latter can make the incoming funds available to the final beneficiary without reservation.

For cheques and direct debits, there is some credit and liquidity risk as the items are credited "subject to collection".

3.3.6 Pricing

The following prices are charged (as from 1 July 2002). Data records submitted on EDM or by data telecommunication are subject to a transaction fee of EUR 0.0015 per data record. No minimum fee is charged any more. Additionally, the EDM is subject to a fee of EUR 7.50 per item, the delivery of paper-based items (eg direct debits) EUR 0.25 per item. Paper-based credit transfer orders of non-banks and paper-based cheques submitted are billed EUR 0.30 per item; the sorting and delivery of GSE cheques for credit institutions is charged with an additional fee of EUR 0.30 per item.

3.3.7 Future trends

Plans are under way in close cooperation with the German banking industry to allow data records to be submitted until the morning of the next business day by the end of the first quarter of 2003 and to introduce further data telecommunication standards. In addition, discussions are in progress with a view to using the international SWIFT data exchange standards in RPS and to use the system as a German entry point to STEP2, a future clearing and settlement system for European retail payments of the Euro Banking Association (EBA).

3.4 Bilateral interbank clearing

For the interbank clearing of retail payments beyond the entity's own network, there is an additional procedure, known as bilateral interbank clearing ("garage clearing"). It consists of the bilateral exchange of files or data media between the main clearing institutions of the giro networks containing data for banks which can be reached via the respective receiver. Historically these bilateral exchanges of data (eg via tapes) were executed on the premises of the branches of the Deutsche Bundesbank and/or in a "garage/car park" of a commercial bank. Nowadays payment transaction data are increasingly exchanged via data telecommunication channels. The Bundesbank's RTGS system (= central bank money) is used only to effect gross settlement of the bilaterally exchanged data (transfer of the total of the data files or carriers exchanged bilaterally). The banks have only to pay a Bundesbank fee for the settlement rather than for huge numbers of individual retail payments. The decision to operate in this bilateral manner is based on purely commercial reasons.

3.5 Innovative payment procedures

3.5.1 E-banking and e-money

The German banking sector is currently undergoing a process of fundamental change, caused by, among other things, the possibilities offered by home banking. Here a distinction must be made between electronic banking in closed networks - as offered, for example, by the online service provider T-Online AG (a subsidiary of Deutsche Telekom AG) - and internet banking (open network). In addition to providing payment transaction services, home banking can also be used both for account management and securities transactions and for obtaining information. It was estimated that there were 19 million online accounts in Germany in 2001. It is further estimated that at the end of 2001 there were 29 million internet users, and it is reckoned that at the end of 2005 there will be 43 million. During the stock boom period (in the years 1998 to 2000) the number of customers conducting stock exchange business online doubled. The growth rates have decreased since the stock markets dropped off in 2000. Nevertheless, the increase in new online accounts is unbroken and is expected to continue as confidence in the usage of the technology increases as well.

Given the rapid increase in internet use, the share of electronic commerce⁵ (e-commerce) in the total volume of trade will grow even further. Secure and efficient payment systems are prerequisites for the projected growth of e-commerce, since e-commerce will only be of interest to companies and private individuals if fast, simple and, above all, secure payment systems are available.

It is becoming evident that in e-commerce between companies and private households, debit and credit cards are being used for the payment of larger amounts and e-money is being used for very small to small amounts. Here the borderline between e-money based on hardware and e-money based on software is becoming blurred, as card money can also be used for remote payments via the internet.

Major banks and other institutions working in cooperation with banks have developed e-money schemes besides GeldKarte, such as PayCard, CyberCash and eCash. So far none of them has been playing a pivotal role. Indeed, CyberCash and eCash have now discontinued their operations. The expectations of rapid growth in these markets have been shattered by the fact that suppliers of goods and services and consumers have so far not accepted those payment methods.

3.5.2 Other developments

With EDIFACT a uniform global format for the processing of electronic business and trade was created.

In 1997, in step 1, both the conditions for the exchange of EDI messages between the parties named in the contract and the requisite technical accessories were established with a view to handling business transactions between customers and banks via remote data transfer. In the second step,

⁵ Electronic commerce is the handling of business processes of all kinds via electronic networks.

mandatory EDIFACT acceptance was introduced on 7 February 1998, a uniform global format for the processing of electronic business and trade. Since then, all banks have had to be in a position to receive EDIFACT payments. In addition, there is no longer any need to convert EDIFACT messages into a national format. The Deutsche Bundesbank accepts EDIFACT payments in the ELS within the framework of electronic access to the Deutsche Bundesbank. Because of the very small number of payments in that format the Bundesbank deliberately does not accept such payments in RTGS^{plus}.

4. Securities settlement systems

4.1 Trading

4.1.1 Legal foundations of stock exchange trading

The legal principles governing stock exchange trading are not embodied in a single act dealing with all issues relating to the stock exchange system. The Stock Exchange Act (BörsG) and the German Securities Trading Act (WpHG), the scope of application of which extends to stock exchange trading, provide the public law framework. Moreover, stock exchange trading is based on a further system of legal provisions of varying legal quality. These are based to some extent on public law (eg the Stock Exchange Rules), and to some extent on private law (eg the terms and conditions of trading on German stock exchanges). The provisions vividly reflect the characteristic legal traits of the stock exchange structure: on the one hand, there are stock exchange organs and supervisory bodies with sovereign powers, and on the other hand there are trading activities based on private and public law between licensed stock exchange participants, which include the intermediary services performed by brokers.

4.1.2 Financial intermediaries engaged in the various securities markets

Permission to trade officially on the stock exchange is granted only to representatives of banks and to official exchange and independent brokers.

Third parties not licensed to trade on the stock exchange must utilise the services of banks, since only the latter are allowed to act as brokers for third parties, while intermediary services between banks are performed by official exchange and independent brokers.

4.1.3 Trading segments

The stock exchanges are divided into several segments which are in turn subdivided into various categories according to the rules and requirements governing the securities being traded. A distinction can be drawn between a regulated market set out in the European Investment Services Directive (ISD) and the regulated unofficial market. The official market, the regulated market and the Neuer Markt segment comply with the requirements for a regulated market in the ISD. The listing requirements and subsequent obligations in relation to securities vary according to the market segments concerned.

In Germany, shares are currently order-driven and floor-traded by brokers on eight stock exchanges. The stock exchanges are located in Berlin, Bremen, Düsseldorf, Frankfurt/Main, Hamburg, Hanover, Munich and Stuttgart. In addition, stock market participants use the electronic trading system XETRA operated by the Frankfurt Stock Exchange (FWB), which generates the highest turnover.

4.1.3.1 Official market

The German stock exchanges' official market segment is the segment with the strictest requirements for companies in search of capital and where the lion's share of transactions in shares and bonds is carried out. When a company is listed on the stock exchange, a detailed prospectus must be supplied giving precise information on the company. In addition, interim reports and an annual balance sheet must be published in a stock exchange gazette. Exchange prices for securities listed for the official market will continue to be fixed by officially appointed, sworn brokers until July 2005. With the new Stock Exchange Act from July 2002 the link between the listing of securities in a market segment and a single form of price determination by official and independent brokers was discontinued. After a

transitional period of three years (up to July 2005) it will be left to the stock exchanges to decide on the configuration of the trading systems they use (floor trading with brokers, computer-assisted or fully computerised trading).

Clients have the right to have their orders carried out at the fixed price. Orders on an unlimited basis are given preference when prices are fixed.

The regulated market

The regulated market provides companies with easier access to trading on the stock exchange than is the case with official trading. The market is characterised by simplified listing requirements and disclosure rules which are intended to offer medium-sized companies in particular an inexpensive way of having their shares traded on a market that is regulated by law and under the supervision of a stock exchange. Under the new Stock Exchange Act, stock exchanges now have the opportunity to introduce additional requirements for certain areas of the regulated market in special segments, or market segments in general, with the consent of the supervisory authorities.

The stock exchange introduction prospectus (company report) can be shorter. It must be published, but not necessarily in the stock exchange press. In addition, fixed interest securities are also traded on the regulated market. Prices are fixed by brokers commissioned and supervised by the stock exchange management in accordance with the same regulations that will apply in future to the official market.

The Neuer Markt

The Neuer Markt (New Market) created by Deutsche Börse AG in the first quarter of 1997 is designed to operate as an additional stock market segment to strengthen the share capital market for young high-tech companies. The Neuer Markt segment was introduced on the Frankfurt Stock Exchange and is operated by Deutsche Börse AG. Key features are the high degree of transparency offered by companies to investors in this market and the strict listing requirements. Research reports and information on its clients' companies help to bridge the information gap between the issuer and the investor.

The Neuer Markt does not constitute a separate segment on the stock exchange. In terms of stock exchange legislation it belongs to the regulated market segment.

Access to the Neuer Markt is such that permission for a listing must be obtained in the regulated market while the listing is entered in the Neuer Markt segment. Owing to its admission to a public law market segment, the Neuer Markt is subject both to public law monitoring by the Trading Supervision Authority (Handelsüberwachungsstelle) and the Stock Exchange Supervisory Authority (Börsenaufsichtsbehörde) as well as to the Securities Trading Act (WpHG). Trading is carried out continually via designated sponsors who secure the purchase and sale of securities by providing the bid and offer prices. The Neuer Markt also procures additional liquidity for an asset through its duty to provide purchase and sales prices on request.

4.1.3.2 The regulated unofficial market

The regulated unofficial market is an unofficial securities trading segment operating on the stock exchange floor during trading hours. It provides for trading in securities (shares, bonds, warrants) which have not been listed either in the official or regulated market. It also serves as a market segment for regional and foreign securities. Inclusion in unofficial trading on the stock exchange is approved after application from "a company authorised to trade on the exchange", usually a bank. The listing requirements are limited; there is no obligation to publish a prospectus, but a brief exposé must be prepared for every public offer for sale. Public offers generally require publication of a full prospectus that is approved by the Federal Financial Supervisory Authority (BaFin) in accordance with the Securities Prospectus Act. However, the mere inclusion of the securities of an issuer in the regulated unofficial market as such does not constitute a public offer under German law. The brokers are responsible for setting the prices for securities and for the listings.

4.1.4 XETRA

XETRA is Deutsche Börse AG's electronic trading system for spot trading and coexists with floor trading. XETRA is conceived as an order-driven trading system with automatic transaction matching

which consolidates all orders in a central order book that is open to inspection by all XETRA participants. Since October 1998 issuers have been able to assign credit institutions, brokers and securities trading houses as designated sponsors (formerly "Betreuer") to XETRA. There may be one or more designated sponsors for a given security. However, a designated sponsor may look after several securities even without an assignment from the issuer. Designated sponsors create a higher degree of liquidity in XETRA trading by giving binding prices on both the bid and ask sides (quote-driven trading system). Securities are transferred with the help of designated sponsors from daily auctions to continuous trading. With the exception of Dax stocks, the scope of securities for which designated sponsors can be appointed comprises all shares listed at the Frankfurt Stock Exchange.

4.1.5 Eurex

Eurex was conceived jointly by Deutsche Börse AG and the Swiss Stock Exchange in December 1996 and established in 1998 through a merger between Deutsche Terminbörse (DTB) and SOFFEX. It is thus the common futures and options market of the German and Swiss stock exchanges. Eurex is an independent, fully electronic market for forward exchange transactions, ie both futures contracts and listed options are traded.

Eurex offers a cross-border market featuring a uniform range of standardised products on the basis of a harmonised body of rules and regulations. A distinction is drawn between participants who transact own-account and customer business and those who also perform market-maker functions. The task of market-makers is to provide binding bid and offer prices for the base instruments which they manage.

The futures exchange operates in four phases of daily trading. In the pre-trading period, orders and quotes can be submitted and information retrieved. On the basis of the orders and quotes entered up to this point, a preliminary opening price is displayed in the opening period, which is subject to revision as further orders and quotes are received. A final opening price is determined within the scope of the subsequent compensation process. Trading continues throughout the trading period. Market participants can enter orders and quotes in the system for about two hours after the trading period ends, ie in the post-trading period.

Moreover, since 27 August 2000 Eurex has been cooperating with the Chicago Board of Trade (CBOT) in the area of electronic derivatives trading on a jointly developed platform based on Eurex technology. The joint venture company a/c/e (alliance/cbot/eurex), in which each partner holds an equal share, provides access to the products of both stock exchanges via one trading screen.

4.1.6 European Energy Exchange

The European Energy Exchange represents the first integrated spot and futures market for electricity in central Europe. The spot market was launched on 8 August 2000, and the futures market followed in the fourth quarter of 2000.

The European Energy Exchange unites the technology of the XETRA and Eurex stock exchange trading systems. Its aim is to enable European market participants to trade freely in energy.

4.1.7 Recent developments

Founded in October 2000, Eurex Bonds is a joint initiative of Eurex Frankfurt AG and leading financial institutions. Eurex Bonds is an electronic trading system for bond trading within the Deutsche Börse Group. Participants are able to combine bond trading on Eurex Bonds with basis trading (the arbitrage between futures contracts and bonds) and since July 2001 repurchase agreement trading (repo) electronically on Eurex. In addition, basis trading is offered for all bonds which are deliverable through Eurex's capital market futures. All fixed income debt instruments issued by the Federal Republic of Germany and by the Treuhandanstalt, jumbo Pfandbriefe and bonds issued by the European Investment Bank, Kreditanstalt für Wiederaufbau and the German federal states are available for trading. Twelve market-makers provide for liquidity in these products, too, and transactions are cleared via Eurex Clearing AG and settled via Clearstream Banking AG Frankfurt (CBF), Clearstream Banking S.A. Luxembourg, and Euroclear Bank Brussels.

The idea is to achieve, by limiting the circle of participants, more flexibility than the traditional stock exchange structure has been able to provide, which is why the group is to be confined to 14 banks with market-maker functions. Trading is based on a model in which quotes and orders are entered into

a central quote book. During trading hours, orders entered into the system are executed against the best available bid or asked prices. Trading on Eurex Bonds can be done via the Eurex Bonds trading system or via the internet. There are currently 23 European banks connected to Eurex Bonds. Participation in the system is available to all banks and financial services firms which fulfil the trading and clearing admission requirements.

The Bundesbank, with its special status that does not include market-maker functions and a capital holding, has been trading on Eurex Bonds for the account of the Federal Government since October 2000. The operators of Eurex Bonds introduced in 2001 a repo trading facility via the internet-based platform "Eurex Repo". Now the participants are able to conduct cash trading, basis trading and repo trading on one platform. The German Finance Agency joined Eurex Bonds at the beginning of 2002. The Agency has been the central service provider for the Government of the Federal Republic of Germany since 2001 in all matters relating to debt management. Eurex Bonds has enlarged the list of instruments to include "Jumbo Pfandbriefe" (asset-backed securities), agency bonds (such as "Kreditanstalt für Wiederaufbau") and regional government (Länder) bonds.

4.1.8 Supervision of trading in securities and derivatives and exchange supervision

Trading of securities and derivatives in Germany is supervised on three levels:

- the BaFin;
- supervisory authorities of the Länder;
- trading supervision authorities of the stock exchanges.

Moreover, anyone wishing to provide commercial securities services needs a banking licence from the BaFin.

The supervision of securities and derivatives trading by the BaFin serves the objectives of market transparency, market fairness and investor protection. The tasks of the BaFin are as follows:

- surveillance to prevent and detect illegal insider and price and market manipulation activities;
- monitoring ad hoc disclosure requirements of listed companies and disclosure requirements regarding directors' dealings;
- monitoring the disclosure requirements in the event of a change in the voting rights held in companies whose shares are admitted to trading on an organised market within the European Union or the European Economic Area;
- monitoring compliance with German rules of conduct relating to customer transactions;
- depository for prospectuses;
- international cooperation with regulatory and supervisory authorities responsible for securities exchanges, securities and derivatives trading in matters relating to the supervision of securities trading;
- authorisation of foreign organised markets in Germany; and
- monitoring takeovers in Germany.

As a rule, the stock market supervisory authorities of the Länder are responsible for legal and market supervision, ie:

- supervision of compliance with stock exchange regulations;
- regulation of stock exchange trading and the processing of stock market transactions;
- tasks relating to approval;
- the issuing of necessary orders for the exchange and the trading participants which are designed to prevent violations of exchange law provisions and orders, or to eliminate or prevent irregularities which could impair the orderly conduct of exchange trading, the settlement of exchange transactions and the supervision thereof; and
- authorisation of Alternative Trading Systems (ATs) domiciled in Germany.

The Trading Supervision Authority (HÜST) is an independent organ of the stock exchange and exercises direct market supervision. It systematically and meticulously records all data relating to trading and processing on the stock exchange and checks them for conspicuous features and irregularities. In this manner, it controls pricing and price fixing. In addition, it performs transaction checks among official exchange brokers and independent brokers and investigates suspect cases.

4.2 Clearing

The clearing house for the Eurex exchanges is Eurex Clearing AG. Eurex Clearing AG serves as the central counterparty for derivatives traded on Eurex. As a central counterparty, the clearing house interposes itself as buyer to every seller and as seller to every buyer (netting by novation). Counterparty risk is reduced since each clearing member will have the clearing house as its counterparty in place of other market participants, which in most cases will not have the same credit quality as Eurex Clearing AG. By consolidating exposures under Eurex Clearing AG as the central counterparty, members receive the maximum benefits arising from the correlation between risk positions and portfolio diversification. A risk-based margining system based on value-at-risk methodologies allows for the maximum benefit to members, while maintaining the clearing house's financial soundness at the levels targeted by the risk-carrying community.

In addition, Eurex introduced a remote clearing system on 1 August 2000. This enables participants from each country in the European Union or Switzerland not only to participate directly in trading, but also to handle the clearing and settlement themselves.

Eurex Clearing AG also has plans to expand its central counterparty clearing services to securities. As a first step, it has taken over this role in the Eurex bond and repo trading system. A further step will be the introduction of a central counterparty for equities announced for the first quarter of 2003.

4.3 Settlement

4.3.1 *Legal foundations for custody operations by banks*

The Safe Custody Act of 1937 constitutes the legal basis for the safe custody and administration of securities by banks. This Act serves to protect the owners of securities who deposit them with banks. In particular, it ensures that purchasers acquire proprietary rights to their securities as soon as possible and that they do not lose these proprietary rights if the depository bank should encounter financial difficulties.

Banks may, in their own names, give custody of their customers' securities to some other (third-party) custodian. This is not a violation of the rights of the depositor since the third-party custodian must assume, in principle, that the securities delivered are the property of the customers of the submitting bank (principle of non-property presumption). In particular, without special permission, no securities belonging to customers may be used to cover the liabilities of the banks involved. Institutions involved in custodian operations are by definition banks pursuant to the KWG and are thus within the ambit of banking supervision. In particular, this sector of business is subject to a special audit each year.

The Safe Custody Act (a special item of legislation for the banking sector) deals with the custody of securities by banks, as a rule in the form of collective safe custody or - at the request of the owner or if only individual certificates are issued - in the form of individual safe custody. Owing to rationalisation and cost factors and the general benefits of the book-entry system, only collective safe custody of immobilised or dematerialised securities is of significance today. Dematerialisation of securities is by law restricted to government issues. Legally dematerialised securities are treated in the same way as securities in collective safe custody.

In line with the possibilities laid down by the Safe Custody Act for custody of securities, the securities acquired by an investor are as a rule kept and administered, via a bank (intermediate custodian), at Clearstream Banking AG Frankfurt⁶ (third-party custody). For dematerialised securities, Clearstream is

⁶ Referred to as Clearstream unless otherwise specified.

entered as fiduciary in the collective debt register administered by the Federal (or Länder) Debt Administration, or else registration is effected in the individual debt register also administered by the Federal (or Länder) Debt Administration.

4.3.2 Germany's central securities depository

4.3.2.1 Legal and organisational framework

Clearstream Banking AG Frankfurt is Germany's *Wertpapiersammelbank*, or central securities depository (known informally as the CSD). It received permission from the BaFin to operate a bank in 1949. This banking licence was a restricted one, in line with Clearstream's past functions as a specialised institution, which has been extended recently. Until end-1999, Clearstream Banking AG Frankfurt - under its former name, Deutsche Börse Clearing AG, Frankfurt - was a wholly owned subsidiary of Deutsche Börse AG. On 1 January 2000, in the course of a capital increase, Deutsche Börse AG transferred its shares in Deutsche Börse Clearing AG to Clearstream International SA, Luxembourg. In return, Deutsche Börse AG received half of the shares in this newly established holding company. With regard to the ownership structure of Clearstream Banking International SA, Deutsche Börse successfully took over the remaining 50% stake held by Cedel International SA. Thus, Deutsche Börse has control of both a national (Clearstream Banking AG Frankfurt) and an international CSD (Clearstream Banking S.A. Luxembourg).

Customers of Clearstream can be domestic or foreign credit and financial service institutions or specialised public institutions. In addition, foreign CSDs and clearing organisations or supranational financial organisations can open securities and cash accounts with Clearstream. A requirement for admission as a customer of Clearstream is, among other things, that the respective institution be subject both to the provisions governing statutory auditing of securities deposits under the KWG and the laws of the country of origin in question, or voluntarily allow its safe custody accounts to be audited. Almost all banks engaged in securities trading or in custody operations maintain accounts with Clearstream. Institutions without a direct link to Clearstream can make use of the services offered by Clearstream indirectly via Clearstream customers.

Unlike many other national CSDs, Clearstream - one of the founding members of the European Central Securities Depositories Association - has a long history of establishing links with other countries with regard to the custody of foreign securities, even prior to the launch of European economic and monetary union.

Ownership of securities is transferred by book entry in the case of instruments in collective safe custody, or by physical delivery of the certificates in question. In the case of collective safe custody, the standard form of custody in Germany, the investor receives co-ownership - on the basis of the nominal amount or the number of securities it holds - measured in fractions of the collective inventory of a class of securities. Ownership passes once the booking entry has been completed (in the case of FOP - free of payment - settlement) or the bookings of securities as well as the appropriate cash positions have been processed (in the case of DVP - delivery versus payment). The settlement system of Clearstream is a "designated securities settlement system" governed by the Settlement Finality Directive.

Owing to the vast number of instruments it holds in custody and the number of transactions concluded each day, Clearstream has been providing cost-effective services for years. The transparent price structure is based on the principle that costs are borne by the party which creates them, giving incentives to customers to utilise the automated services available.

4.3.2.2 The settlement procedures of Clearstream Banking AG Frankfurt

Settlement of exchange-traded and OTC trades

All business transacted on stock exchanges, whether on the floor or via the electronic trading system of Deutsche Börse AG, XETRA, is automatically forwarded for processing to Clearstream Banking AG Frankfurt via appropriate IT facilities. On each banking day, the IT system generates a delivery list containing the specific data on the stock market transactions in question for checking purposes. Discrepancies have to be reported before the beginning of the next trading session. If no discrepancy is reported within a certain time, the underlying transaction will be deemed to have been accepted on a conclusive basis. Accordingly, confirmations among the business partners are not provided for. According to the stock exchange rules and regulations, all transactions have to be settled on the

second stock exchange day following the day of trading (T+2). Settlement lists are generated by the system as on the day of settlement, reflecting all securities account movements for the day in question along with the respective countervalues.

OTC transactions can be settled free of payment. Transactions against payment are only effected following a prior matching based on certain matching criteria. These transactions are entered by the parties concerned, and the system performs the settlement of the transactions. The settlement day can vary between T+0 and T+40. If the settlement day is T+0, same day processing and real-time settlement are possible (see below).

Basic settlement model

At Clearstream, securities transfers against payment are generally effected only on the basis of DVP, ie simultaneous delivery of securities and payment of the relevant cash equivalent. A precondition for DVP settlement, therefore, is that Clearstream customers have both adequate securities cover in their custody accounts and cash cover in their Deutsche Bundesbank accounts.

In technical terms, using the batch mode described below, the securities transfers are arranged in advance (provisional bookings) but only become final, from a legal point of view, once the Clearstream cash settlement procedure has been successfully concluded. Payments are processed in euros via accounts with the Deutsche Bundesbank. The cash clearing for standard settlement (STD) and the first same day settlement on the settlement day (SDS 1) take place between approximately 10.30 am and 11.30 am. The corresponding time of the cash clearing for the second same day settlement (SDS 2) is roughly between 1.30 pm and 2 pm.

In real-time settlement (RTS), simultaneous processing is also used in order to ensure that the final booking entries relating to the securities and payments are effected at the same time. RTS with DVP functionality takes place continuously between 7 am and 4.30 pm. The operating times of free of payment RTS deliveries, from 6 am to 6 pm, are even longer.

By adhering to the DVP principle, the settlement or principal risk is avoided, ie neither of the two trading partners needs to unilaterally render payment or delivery in advance. If customers do not have an adequate number of securities in their custody accounts, they can use Clearstream's automatic securities lending facility. Cash requirements can be covered through the usual central bank lending facilities, since the amounts are settled via central bank accounts.

Technical handling of processes (three batch processes, one real-time process)

The settlement of securities transactions within the scope of standard and same day settlement cycles (STD and SDS) is performed on a gross basis (provisional bookings only). Cash settlement is performed on a net basis. Instructions for the transfer of securities are processed in three batch-mode cycles. The batches are intended to maximise by iteration the number of settlement orders effected on the basis of the securities available in the participants' accounts. Account is taken of the priorities stipulated by customers when placing their orders with regard to the date of settlement (older, outstanding orders being processed first) and the scope of trading (large transfers are dealt with before processing smaller ones). At the end of a batch, each participant will have a single net cash position, since all incoming and outgoing payments are netted against one another.

The first batch, STD, takes place in the evening preceding the settlement day (S-1). The second (SDS 1) is effected in the morning of the settlement day (S). For standard settlement (STD), which as a rule takes place as of 7 pm, orders must be entered on S-1 by 7 pm at the latest. For the same day settlement cycle, SDS 1, the cutoff time for booking entries is 10 am on S. At the end of each batch run, ie at about 9 pm and 10.30 am respectively, Clearstream makes both a list of processed transactions (settlement list) and the net cash position (debit or credit balance) arising in the process available to the participants. If no securities are available on the participants' accounts, the instructions for delivery will not be carried out. Orders not executed are automatically transferred to the next processing period (ie scheduled either for the next standard or same day processing run).

Participants who have a negative net cash position at the end of SDS 1 (which includes the cash results of the standard settlement cycle) must arrange for the necessary cover to be made available in their Bundesbank accounts in due time. This cover can consist of a credit balance or available overdraft facilities. At 11 am, the Deutsche Bundesbank - via its various branches - debits the accounts of all banks with a net debit position, on instruction by Clearstream. Once all debit balances are covered, Clearstream disburses the amount in question to those participants who have a positive

net position. As a result of this disbursement, the preliminary securities transfers executed in the batches also acquire final status. If a participant with a debit position is unable to provide the necessary cover, the worst case scenario is that the settlement for that particular batch cycle will need to be unwound. However, this has never been necessary in the past, since Clearstream has additional means in place to contain this risk.

From about 10.45 am to 2 pm SDS 2 takes place, operating along the same principles.

Apart from standard and same day settlement, Clearstream provides a real-time DVP settlement service. Securities transfer orders can be forwarded to Clearstream on-screen between 6 am and 4.30 pm by both parties involved. The Clearstream system matches the orders, blocks the securities to be sold in its own system and electronically instructs the Deutsche Bundesbank to debit the cash account of the buyer. Once the debit entry has been made, ownership of the blocked instruments passes to the buyer, and the seller receives the cash amount in question.

4.3.2.3 Outlook

As part of its corporate integration plans, Clearstream Banking AG Frankfurt has transferred its global business (international bonds and equities) to the Creation settlement platform of its ICSD sister company Clearstream Banking S.A. Luxembourg (see also the Eurosystem chapter). The next step in this framework will be carried out by transferring the domestic securities business into a new settlement model designed in cooperation with Clearstream's participants. The main goals to be achieved by introduction of the new settlement model are pooling of liquidity, efficient cash clearing with maximum flexibility as well as elimination of the unwinding risk. The new settlement model, comprising both night-time and daytime processing, will provide the following specific features:

- technical netting, continuous finality and multiple batches;
- provisioning of liquidity prior to each batch in which securities transactions are to be settled - "pre-funding" will be performed solely through central bank money;
- achievement of DVP settlement by simultaneous settlement of cash and securities;
- transfer of cash credit balances without delay upon receipt of a request for payout by the customer;
- combination of mandatory and optional batches during daytime processing.

4.4 The use of the securities infrastructure by the Deutsche Bundesbank

Like any commercial bank, the Deutsche Bundesbank uses Clearstream for its customer business, ie for securities trading activities for the public sector, foreign central banks and international organisations as well as for associated services in the area of custody accounts.

In addition, Clearstream plays an important role in implementing the monetary policy of the ECB and granting intraday credit for payment system purposes. These credit operations are to be collateralised in accordance with Article 18 of the Statute of the ESCB. To this end, the Deutsche Bundesbank's counterparties hold a pledge pool with the Bundesbank, which consists of four parts:

- (1) securities in custody accounts kept with the Deutsche Bundesbank and pledged to the latter (these are known as "operational safe custody accounts" (Dispositionsdepots));
- (2) securities in custody accounts held with Clearstream and pledged to the Deutsche Bundesbank (pledge accounts in the collateral management system Xemac® of Clearstream Banking AG Frankfurt);
- (3) securities delivered via correspondent bank accounts with other central banks and pledged to the Deutsche Bundesbank (correspondent central banking model; see also Section 4.3.1 of the euro area chapter); and
- (4) non-marketable debt instruments (Tier 2 assets; eg pledged bank loans) which are directly held by the Deutsche Bundesbank.

In the case of Deutsche Bundesbank operational safe custody accounts, Clearstream assumes the role of delivering agent, and securities are delivered "free of payment" from a custody account of a Bundesbank counterparty with Clearstream to the Bundesbank's custody account with Clearstream for

crediting to the respective counterparty's custody account with the Bundesbank. The Deutsche Bundesbank assumes the daily valuation of collateral inventories according to the uniform Eurosystem criteria on its own responsibility. Clearstream has no further tasks; the Deutsche Bundesbank is largely independent of Clearstream in the day-to-day operation of the operational safe custody accounts and does not require an online interface for each single monetary policy operation or each single intraday credit for payment transactions in the course of a business day.

However, Clearstream does assume additional functions within the scope of its Xemac© pledge account system. In Xemac©, lump sums determined on a long-term basis are, as a rule, pledged. These are reported to the Bundesbank as an overall total. In addition, any changes to these lump sum amounts are reported to the Deutsche Bundesbank. By means of the direct links between Clearstream and other CSDs, non-German government bonds can also be pledged via Xemac© in favour of the Deutsche Bundesbank. Clearstream assumes the daily valuation of the securities in accordance with the Eurosystem criteria and automatically arranges for subsequent deliveries of securities which may be necessary in the event that the lump sum amount should be undermined due to price fluctuations.

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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

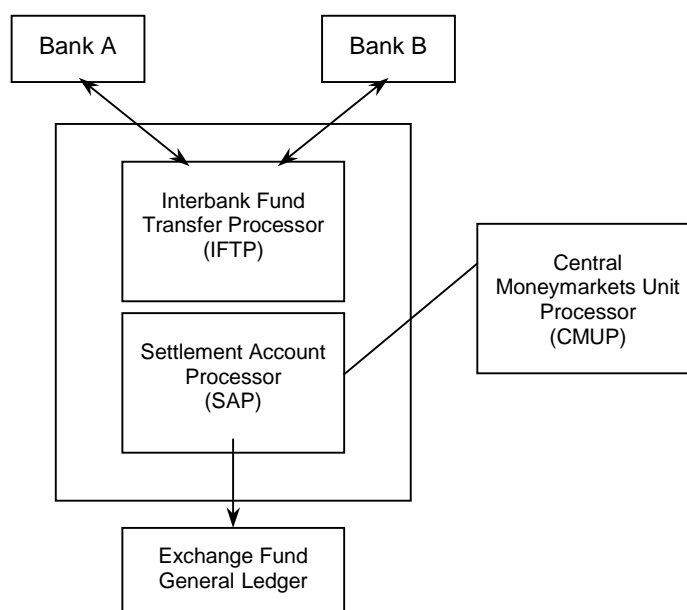
3.1 The real-time gross settlement (RTGS) system for HKD

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

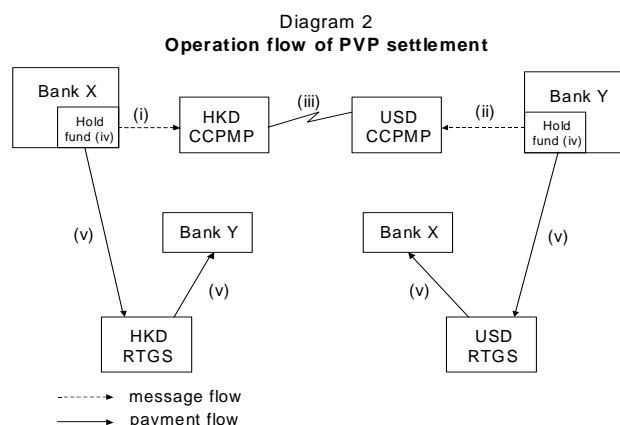
3.1.5.3 Delivery versus payment (DVP)

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.

**Payment systems in
Italy**

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List of abbreviations

ABI	Italian Bankers' Association - <i>Associazione Bancaria Italiana</i>
AIPA	Authority for Information Technology in the Public Administration - <i>Autorità per l'Informatica nella Pubblica Amministrazione</i>
BI-COMP	Bank of Italy clearing system - <i>Bank of Italy Compensazione</i>
BI-REL	Bank of Italy real-time gross settlement system - <i>Bank of Italy Regolamento Lordo</i>
BIR	Large-value credit transfers - <i>Bonifici di Importo Rilevante</i>
BOE	Cross-border credit transfers - <i>Bonifici Esteri</i>
CAI	Interbank database on cheques and payment cards - <i>Centrale d'Allarme Interbancaria</i>
CCG	Clearing house - <i>Cassa di Compensazione e Garanzia</i>
CIPA	Interbank Convention on Automation - <i>Convenzione Interbancaria per i Problemi dell'Automazione</i>
CLFI	Consolidated Law on Financial Intermediation
CO.GE.BAN	Convention for the Management of the Bancomat Trademark - <i>Convenzione per la Gestione del Marchio Bancomat</i>
Consob	Companies and Stock Exchange Commission - <i>Commissione Nazionale per le Società e la Borsa</i>
e-MID	Screen-based interbank deposit market - <i>Mercato Interbancario dei Depositi</i>
ELMI	Electronic money institution
EMV	Europay MasterCard Visa
EPOP	Electronic payment order procedure - <i>Mandato informatico</i>
Express	Securities real-time gross settlement procedure - <i>Procedura per il Regolamento Lordo in Tempo Reale dei Titoli</i>
Express II	New securities net settlement procedure (project) - <i>Progetto di realizzazione di una nuova procedura per il regolamento dei titoli su base netta</i>
FATF	Financial Action Task Force
FIB 30	Futures contract on the MIB 30 index - <i>Contratto futures sull'indice MIB 30</i>
GEC	Direct interbank external euro payments and the euro leg of foreign exchange transactions - <i>Giri in euro di conto estero</i>
IDEM	Market for equity derivatives
LDT	Securities net settlement procedure - <i>Liquidazione dei Titoli</i>
MIB 30	Top 30 blue-chip index - <i>Indice azionario dei 30 principali titoli della borsa valori di Milano</i>
MIF	Italian futures market - <i>Mercato Italiano dei Futures</i>
MOT	Retail government and corporate bond market - <i>Mercato Obbligazionario Telematico</i>
MPR	Market for traditional options on equities
MTA	Stock market - <i>Mercato Telematico Azionario</i>
MTS	Screen-based market for government securities - <i>Mercato Telematico dei Titoli di Stato</i>
PCT	Electronic market for repurchase agreements - <i>Mercato Elettronico dei Pronti Contro Termine</i>
RIBA	Electronic bank receipts - <i>Ricevuta Bancaria</i>

Italy

RNI	National interbank network - <i>Rete Nazionale Interbancaria</i>
RRG	Daily matching correction system - <i>Riscontro e Rettifica Giornaliera</i>
SEPA	Single Euro Payment Area
SIA	Interbank Company for Automation - <i>Società Interbancaria per l'Automazione</i>

Introduction

The Italian payment system has changed significantly in recent years in response to European integration, developments in financial markets and the initiatives of the authorities.

Substantial changes in both the legislative framework and the design of the payment system aimed to: (i) bring the Italian legal framework into line with the Maastricht Treaty and European regulations; (ii) strengthen the reliability and efficiency of the Italian payment system; (iii) enhance the efficiency of financial markets; and (iv) promote the use of new payment instruments.

In line with such objectives, Article 146 of the 1993 Banking Law entrusted the Bank of Italy with explicit responsibilities directed at promoting the regular operation of the payment system and fostering its efficiency; the same law envisaged enabling the Bank of Italy to issue specific provisions in the field of payment systems. As regards securities, the Consolidated Law on Financial Intermediation (CLFI) established the principle that the management and organisation of regulated markets are entrepreneurial activities and entrusted the Bank of Italy with surveillance functions on regulated markets relevant to the conduct of monetary policy. In accordance with the CLFI, the settlement of securities transactions may be carried out by a private company, except for the final settlement of the securities cash leg, which, according to the subsequent regulations issued by the Bank of Italy and Consob enacting the CLFI, must be executed in central bank money. Against this background, the Bank of Italy no longer acts as central depository for government securities and Monte Titoli is authorised to operate securities settlement systems. The transposition of the Settlement Finality Directive into Italian law contributed to safeguarding the stability of the payment system in the event of a participant's failure. Recent legislation governing digital signature has laid the foundation for a wider use of open networks in payment activities.

The Bank of Italy's action in the area of retail payment systems is in line with the Eurosystem's oversight policy, which is currently directed at improving the efficiency of cross-border payments, defining security requirements for electronic money schemes and following the development of e-payments and e-commerce. In this framework, the Bank of Italy is involved in verifying the efficiency of banking payment circuits and instruments as well as monitoring postal payment instruments and the progress in integrating bank and postal circuits. With a view to enhancing the reliability of cheques and payment cards, the Bank of Italy implemented the Centrale d'Allarme Interbancaria (CAI), an interbank database on cheques and payment cards, in June 2002. The CAI contains information on natural and legal persons subject to cheque-writing bans, on unauthorised, unpaid, lost and stolen cheques, and on irregular (ie revoked, lost and stolen) payment cards. The Italian banking industry is acting to create the technical and operating conditions required for increasing the efficiency of cross-border credit transfers. In order to improve the reliability and efficiency of payment cards, it is also planning to move from the magnetic stripe to microchip.

As far as interbank payment systems are concerned, in the mid-1990s the Bank of Italy carried out a far-reaching reform aimed at strengthening the stability and increasing the efficiency of the overall payment infrastructure. Such a reform remarkably changed the previous clearing and settlement framework by setting up a new real-time gross settlement system (BI-REL) flanking the net settlement system (BI-COMP). Payments are channelled into the two systems according to their nature: large-value transactions are settled on a gross basis through BI-REL, while retail payments are settled on a net basis through BI-COMP. The direct management of both systems allows the Bank of Italy to closely monitor the risks inherent in their functioning and ensure open and non-discriminatory access to these systems. Even though the BI-REL system has proved to be successful in achieving its set objectives, in recent years technological changes and the new needs of markets and participants have spurred the Bank of Italy to launch another major project (New BI-REL). This new project is directed at improving the efficiency, reliability and security of the BI-REL system with the ultimate goal of strengthening the competitiveness of the Italian marketplace and increasing its openness to foreign intermediaries, including players from present and future euro area countries.

Substantial improvements in the efficiency and stability of securities settlement have been achieved with the launch of a new securities gross settlement procedure (Express), which provides for DVP real-time settlement of both securities and cash legs on a gross-gross basis.

1. Institutional aspects

1.1 The general legal and regulatory framework

The main providers of payment services are the banking system, the Italian Post Office and the Bank of Italy. In accordance with the 1993 Banking Law, banking activity consists in deposit collection on a public basis and the granting of credit. It is restricted to credit institutions, which are also authorised to carry out other activities subject to mutual recognition throughout the European Union (under Directive 2000/12/EC of 20 March 2000), notably the issue and management of payment instruments¹. As a result of merger activities, the number of banks has fallen significantly (from 1,064 in 1990 to 830 in 2001). At the end of 2001, there were 29,270 branches. Foreign banks numbered 60, with 109 branches.

The Post Office plays an important role in the field of retail payments. Over the last few years, postal bank payment services have been growing rapidly so as to compete with the banking system (money orders, credit transfers, giro transfers and, recently, payment cards). In 2001 post offices numbered almost 14,000.

Law 71/1994 has gradually changed the legal status of the Post Office, which, since February 1998, has been a private company owned by the Ministry of the Treasury. The main objectives of the privatisation process have been to improve payment services, to achieve a higher degree of automation, to determine a pricing policy directed at covering production costs and to establish uniform methods for the disclosure of terms and conditions of contract.

As part of the integration of bank and postal circuits, in 1999 the Italian Post Office completed the process of involvement in the interbank procedures for the exchange and settlement of bank and postal cheques. In July 2002 a new agreement made effective the mutual acceptance of cheques. Furthermore, the Bank of Italy fostered the involvement of the Post Office in the low-value credit transfer procedure (in April 2000).

Presidential Decree 144 of 14 March 2001, enacted in May 2001, regulates the banking and financial activities carried out by the Post Office. Accordingly, the Post Office is subject to the same supervisory regime as banking and financial intermediaries. Particular importance is attached to payment services, the integration and interoperability of banking and postal circuits, and the role played by the Bank of Italy as oversight authority.²

Payment services provided by non-banking intermediaries are limited to instruments such as payment cards and money transfers.

The regulatory framework of the Italian payment system is based on the Italian Civil Code, the 1993 Banking Law (Legislative Decree 385 of 1 September 1993) and other specific laws, among which the Codified Law concerning note-issuing banks (see Codified Law 204/1910 and the Bank of Italy's Statutes with reference to bank transactions negotiated or executed by the Bank of Italy).

The Bank of Italy's interest in the proper functioning of the payment system and, in particular, of interbank circuits also stems from its role in the implementation of monetary policy and as supervisor of the banking system. The Royal Decree of 6 May 1926 gives the Bank of Italy exclusive responsibility for managing the clearing system for interbank payments.

The circulation of individual paper-based payment instruments (eg cheques) and the discharge of financial obligations (eg novation and bilateral netting) are governed by the provisions of the Civil Code and other specific laws (see Royal Decree 1345 of 21 September 1933, Legislative Decree 1736 of 21 December 1933 and Legislative Decree 507 of 30 December 1999).

¹ According to Directive 2000/28/EC of 18 March 2000, electronic money institutions, which issue means of payment in the form of electronic money, are credit institutions.

² Article 10 states: "Under Article 146 of the 1993 Banking Law, the Bank of Italy shall adopt all the necessary measures to ensure the integration of the Post Office in payment systems and the interoperability of postal and banking payment circuits."

Legislative Decree 210 of 12 April 2001 transposed into Italian law the provisions of Directive 1998/26/EC on “settlement finality”. With regard to designated payment and securities settlement systems, the decree abolishes the “zero hour rule”, introduces a special regime for guarantees given to the system and issues provisions to protect the participants which settle securities trades on behalf of other intermediaries. If insolvency proceedings are initiated, the Bank of Italy is responsible for collecting all the necessary information and distributing it to all the competent authorities. With regard to cross-border credit transfers, Directive 1997/5/EC was transposed into Italian law by way of Legislative Decree 253 of 28 July 2000.

The 1993 Banking Law, which came into force on 1 January 1994, entrusted the Bank of Italy with explicit responsibilities and powers aimed at promoting the efficiency and reliability of the payment system (Article 146 on payment systems oversight). This function is performed in accordance with the Guidelines issued by the ECB.

With regard to the transparency of banking services, the 1993 Banking Law gave the Bank of Italy the power to control the way in which commercial banks deliver the information they are required to provide to customers.

Competition is safeguarded by the antitrust law, and the responsibility for preventing restrictive practices in the banking system is entrusted to the Bank of Italy (see Law 287 of 10 October 1990).

Law 197/1991 enabled the Bank of Italy to supervise the activities of non-banks which operate in the payment system, including intermediaries which carry out funds transfers via payment cards, in order to counteract money laundering. The same law limited the use of cash to payments of up to around EUR 10,000.

In 1994, following the implementation of a European Investment Service Directive, the Italian parliament instructed the government to enact a CLFI. At that juncture the government took the opportunity of changing the regulation on issuers of securities on regulated markets with the purpose of improving the protection of investors and the interests of minority stakeholders.

The CLFI, which came into effect in February 1998, is therefore divided into three main parts: a regulation on issuers of securities on regulated markets; a regulation on financial intermediaries; and a regulation on financial markets and the CSD.

The CLFI confirms the private nature, first established by Legislative Decree 415/96, of the management of financial markets, SSSs and the CSD. Privatisation has been achieved by separating the management functions, assigned to private companies, from the supervisory functions, assigned to the public authorities.

In this context, the financial markets have been privatised and financial services, from trading to settlement, are no longer strictly considered as public services. In order to enhance competition among financial services, financial markets are now managed by private companies, while settlement services are being privatised. The privatisation of financial markets and CSDs is specified in the CLFI (see Articles 61, 80 and 204), while the privatisation of settlement systems, particularly SSSs and clearing houses, is the result of the establishment of general regulations pursuant to the CLFI (see Articles 69 and 70).

The legal framework of CSDs has been completed by means of a number of rules on financial instrument dematerialisation established at the start of economic and monetary union. Dematerialisation is compulsory for all government bonds, for all private listed securities and for financial instruments as set out by the Companies and Stock Exchange Commission (Consob) and the Bank of Italy according to their degree of circulation.

Law 39 of 1 March 2002 transposed into Italian legislation European Directive 2000/46/EC on the taking-up, pursuit and prudential supervision of the business of electronic money institutions. The law empowers the Bank of Italy to define prudential supervision requirements regarding the financial stability of ELMIs and oversight requirements for e-money instruments and circuits.³ The process of

³ Article 55 amends Article 144, paragraph 4 of the 1993 Banking Law, which now states that, pursuant to Article 146 of the 1993 Banking Law, the Bank of Italy issues regulations aimed at enhancing the development of electronic money, ensuring the reliability of circuits and fostering their smooth functioning.

defining the requirements is currently under way; failure to observe the requirements will be subject to administrative sanctions.

1.1.1 The legal framework of regulated financial markets

In Italy the competent authority for regulated markets is Consob; however, the CLFI provides a derogation for those markets that are considered relevant for monetary policy.

In particular, the Ministry of the Treasury, having consulted the Bank of Italy and Consob, shall regulate and authorise wholesale markets for government securities. Currently, MTS SpA is the only Italian market management company authorised to manage wholesale markets for government bonds (see Section 4.1.1).⁴

1.1.2 The process of privatising the securities clearing and settlement systems

The Italian settlement system has long been characterised by fragmentation. In particular, the CSD's activities (notably custodial activities) have always been separated from the management of SSSs. Moreover, the government bond central depository system has been managed by the Bank of Italy and since 1974 the private securities depository system has been operated by Monte Titoli, a private company controlled by the Bank of Italy. The SSS has always been operated by the Bank of Italy. The implementation of the CLFI provided an opportunity to reorganise and privatise the securities clearing and settlement systems; in issuing the relevant regulations, the Bank of Italy and Consob maintained the provision requiring the securities cash leg in euros to be settled in central bank money. Pursuant to a provision of the CLFI, the Bank of Italy's share in Monte Titoli was sold in December 2000. Monte Titoli is developing a project for a new netting system to be implemented in the course of 2003, which should replace the securities net settlement procedure (LDT) (see Section 4.2.1).

Three different legislative provisions define the legal principles for the entire settlement system, which consists of an SSS, a CSD and clearing houses for derivative instruments.

SSSs are now governed by a general regulation issued by the Bank of Italy, in agreement with Consob (see the legal provision of 8 September 2000 on the clearing and settlement of transactions in non-derivative financial instruments under Article 69 of the CLFI). This regulation lays down the general framework and the conditions under which SSS activities can be managed by a private company.

The CSD's activities are governed by a regulation issued by Consob and the Bank of Italy (see Consob Regulation 11768/98) which defines the members, instruments and the company's instrument-related activities.

The activities of derivatives clearing houses are now governed by a general regulation issued by the Bank of Italy, in agreement with Consob (see the legal provision of 8 September 2000 on the clearing and guarantee of transactions in derivative financial instruments under Article 70 of the CLFI). The regulation states that the company must have a minimum level of capital and must adopt measures of risk containment such as the collection of margins. A more complete and specific regulation on central counterparty clearing of cash and derivative financial instruments will be issued by the Bank of Italy in agreement with Consob. This forthcoming regulation will lay down the general framework for guaranteeing transactions in financial instruments and replace the legal provision of 8 September 2000 on derivatives.

1.2 The role of the Bank of Italy

1.2.1 Payment systems oversight

The Bank of Italy has the power to exercise a controlling and guiding influence over financial activities in the field of payment services. The public interest in the payment system stems from the need to

⁴ Italian government bonds are also traded on Euro-MTS - the wholesale market for European benchmark government bonds managed by EuroMTS Ltd.

ensure its stability as well as to minimise coordination failures which may lead to inefficiencies. Consequently, the role of the Bank of Italy in the payment system is to ensure the smooth functioning of the system in terms of its efficiency and financial reliability.

As mentioned above, the oversight function is officially assigned to the Bank of Italy by virtue of Article 146 of the Banking Law, which states that the “Bank of Italy shall promote the regular operation of payment systems. For this purpose, it may issue regulations to ensure the efficiency and reliability of clearing and payment systems”.

According to the institutional arrangements for the Eurosystem’s oversight functions, the Bank of Italy is the principal overseer of domestic payment systems in those areas not specifically covered by the common oversight policy, namely retail payment systems, within the framework of the objectives and core principles defined at the Eurosystem level.

The oversight activities of the Bank of Italy can be performed autonomously and/or in cooperation with other authorities or private bodies playing an institutional role within the payment system.

The Bank of Italy divulges its policy stance concerning oversight through a full disclosure of its plans and methods of intervention to operators. Accordingly, in November 1999 it published the “White Paper on Payment System Oversight”. This document sums up the economic rationale, the scope of application, the main areas of interest and the instruments currently employed by the Bank of Italy in its capacity as an oversight authority.

A project has been initiated to regulate this function; this project envisages the establishment of rules by the overseer pursuant to Article 146 of the 1993 Banking Law. In particular, this activity should define:

- (i) the objectives with regard to the efficiency and reliability of payment systems, technical infrastructures and instruments;
- (ii) the areas of interest, by specifying the system activities and requirements as well as the rules governing the operation of infrastructures (specific provisions refer to relevant infrastructures);
- (iii) the oversight powers and responsibilities, among which those concerning ex ante and ex post information and control over the expected behaviours.

The oversight function in practice

In order to enhance security and confidence in the use of cheques, Legislative Decree 507 of 30 December 1999 introduced a new set of sanctions regarding cheques and provided for the establishment of an interbank database on cheques and payment cards (CAI), which started operation at the Bank of Italy in June 2002.⁵ In particular, the database contains information on natural and legal persons who have drawn unpaid or unauthorised cheques; these persons will be prohibited, on a system-wide basis, from issuing new bank or postal cheques for a period of six months.⁶ Furthermore, the database contains information on lost and stolen cheques and payment cards as well as on persons whose authorisation to use payment cards has been revoked.

With a view to ensuring the security of payment instruments, it is also crucial to prevent criminal activities. In this respect, the overseer, in cooperation with banking and financial supervisors and other competent authorities (in particular, the Italian Foreign Exchange Office, ie the Italian Financial Intelligence Unit), took part in the work of the European Commission on amending Directive 1991/308/EC on the prevention of the use of the financial system for the purpose of money laundering, and participates in the activities of the Financial Action Task Force (FATF) at the OECD to counter money laundering and the financing of terrorism. At the domestic level, in its dual capacity as payment

⁵ The database sections containing information on payment cards will be implemented at the end of 2002.

⁶ In the past, legislation did not provide for system-wide prohibition, but only for the right of the drawer’s bank to revoke the drawer’s right to issue cheques in the event of a protest or an equivalent statement for cheques drawn against insufficient funds. This procedure, which is still valid, consists of a legal statement lodged by a notary or other public officer certifying the non-payment of cheques. It permits the holder of the cheque to take action against the endorsers and their guarantors in order to recover the funds.

system overseer and banking and financial supervisor, the Bank of Italy published a "Decalogue" with instructions for operators to prevent money laundering to be applied also to innovative payment instruments, such as e-money.

In accordance with Law 287/90, the Bank of Italy performs the role of antitrust authority for the banking sector (see Article 20). In this connection, the overseer analyses the payment systems market open to customers and provides the necessary support for any enquiries concerning antitrust issues with regard to payment instruments.

In cooperation with its supervision departments, the overseer examines customers' complaints about instruments and payment systems with the aim of assessing whether the complaints actually indicate inefficiencies in the payment system (regardless of the outcome of specific disputes).

In early 2001, the Bank of Italy informed the market of its policy concerns over e-money.⁷ Operators were asked to communicate in advance the characteristics of their various projects to the Bank of Italy following the requirements set out in the 1998 ECB report on e-money. In particular, the overseer is interested in information concerning the integrity of the circuit, the efficiency of coordination mechanisms and technical security.

The transposition of the Directive on electronic money institutions empowers the Bank of Italy as oversight authority to issue provisions to guarantee the reliability of e-money schemes and the regular operation of circuits. The new Italian legal framework for e-money schemes takes into account the following factors: (i) the growing number of software-based e-money schemes for retail payments carried out via the internet, which to a great extent involve non-financial institutions; (ii) the widespread diffusion of technology and standards for smartcards, both payment and telephone cards, which are raising new concerns over the security, efficiency and transparency of payment instruments in open networks; and (iii) the ongoing work of the Eurosystem to strengthen the security requirements of each scheme and regulate the interoperability standards in order to improve compliance with requirements 3 and 4 of the ECB report on e-money concerning technical security and protection against criminal abuse.

Legislative Decree 253 of 28 July 2000 - transposing Directive 1997/5/EC on cross-border credit transfers - is a fundamental point of reference with regard to information and customer protection (particularly concerning arrangements for resolving disputes), together with the ECB documents on *Improving cross-border retail payment services*. Criteria and principles derived from the above-mentioned documents will be transposed into new rules in order to improve the efficiency of the retail payment system.

In 1997, Italy became the first country in Europe to consider digital signature as legally binding as handwritten signature (see Presidential Decree 513 of 10 November). The Bank of Italy committed itself to fostering the full interoperability of certificates, which is essential to prevent any loss or damage on the part of customers - in terms of costs and services - due to a lack of coordination among operators. Such interoperability, which is not automatically guaranteed by law, gives rise to the need for a definition of a technical profile for the banking community.

The technical rules governing electronic identity cards were established by Prime Ministerial Decree 437 of October 1999. Pursuant to Legislative Decree 10 of January 2002, transposing Directive 1999/93/EC on electronic signature, the Bank of Italy, in particular in its oversight capacity, gives an opinion as to when an electronic identity card is supposed to be used for payment purposes.

In the course of 2000 the monitoring of retail payment instruments was launched; particular attention was paid to cheques and credit transfers with the aim of protecting consumers. In March 2001 a new survey (involving commercial banks) was carried out by the overseer on execution time and the pricing of cheques, with specific regard to execution times for domestic credit transfers of less than around EUR 50,000 (see Sections 2.2.1 and 2.2.2).

Since "quasi-clearing and settlement systems" have recently emerged, the overseer has assessed one of these systems, which manages the retail payments of cooperative banks, with regard to:

⁷ In line with the Eurosystem's oversight policy stance, the oversight activity on e-money is based on the 1998 ECB report and takes into consideration Recommendation 97/489/EC on the transparency of electronic payment instruments. These guiding principles will be considered when the law on ELMs is enacted by secondary legislation for oversight purposes.

(i) conditions for transactions; (ii) risk management procedures; (iii) the obligations/liabilities of the parties involved; and (iv) the means of settling disputes.

In December 2001 the Bank of Italy performed a self-assessment of the transparency practices relating to payment system oversight on the basis of the IMF Code of Good Practices on Transparency of Monetary and Financial Policies (MFP) (July 2000). The main goal of the assessment was to verify that the oversight policies and practices are presented to the public in an understandable and accessible form and on a timely basis. Since the Italian oversight function is performed within the framework of the European oversight policies and guidelines, the exercise contributed to the Eurosystem's assessment of compliance with internationally recognised standards and codes.

1.2.2 Market surveillance

The Bank of Italy has a supervisory role in those markets which are relevant for monetary policy: the wholesale screen-based market for government securities (MTS) and the screen-based interbank deposit market (e-MID).

With regard to the MTS, the objectives of the surveillance carried out by the Bank of Italy are the overall efficiency of the market and orderly conditions of trading. Since the market is managed by a market management company (MTS SpA), the Bank of Italy supervises this company as well. In accordance with the CLFI (see Article 66), the market management company is authorised by the Ministry of the Treasury in consultation with the Bank of Italy and Consob. The Ministry of the Treasury, in consultation with the Bank of Italy and Consob, approves the rules of the market. The surveillance of market activity is based on the continuous monitoring of trading and a flow of information (data feed procedures) stored in a database updated in real time. The Bank of Italy can request the market management company to provide any kind of data, information and documentation deemed necessary, and may carry out on-site inspections. The Bank of Italy may also request intermediaries to provide additional information on trading activity.

With regard to e-MID, this surveillance activity is based on the acquisition of trading data stored in a database updated in real time. Trading rules are established by the market management company e-MID SpA; the Bank of Italy may request information from the market management company and trading records (see Article 79 of the CLFI). Direct access to the data feed procedures allows the Bank of Italy to monitor prices, volumes, bid-ask spreads and dealers' market positions; further information may be obtained upon request. The Bank of Italy may submit a proposal for the adoption of administrative sanctions against e-MID organisers and participants to the Ministry of the Treasury (see Articles 190 and 195 of the CLFI).

As far as securities settlement procedures are concerned, the Bank of Italy has both regulatory and supervisory responsibilities with regard to the overall infrastructure, ie CSDs, SSSs and clearing houses. The Bank of Italy supervises the settlement management companies as well. The final objective of this framework of tasks, to be exercised in cooperation with Consob, is the containment of the systemic risk inherent in inefficient settlement systems and the prevention of system crises.

1.2.3 The operational role of the Bank of Italy

In Italy the central bank has traditionally played an important role in the direct provision of payment and settlement services with a view to improving the efficiency and stability of the payment system.

The operational role of the Bank of Italy in the payment and securities settlement systems currently entails the issuing of banknotes, the management of both BI-REL and BI-COMP (respectively the large-value payment system and the retail payment system in operation in Italy (see Section 3)), the management of the securities net settlement procedure (LDT), and the management of government payments as a fiscal agent.

Since market privatisation, and given the operational framework envisaged by the CLFI, the securities clearing and settlement services and the activities of the centralised securities custodian have been undergoing profound changes. First, the Bank of Italy no longer acts as custodian or administrator of government securities; those activities are now carried out by Monte Titoli (see Section 1.3.5). Second, by the end of 2003 the same company, which already operates the Express procedure for the real-time settlement of securities on a gross-gross basis, will also be managing the securities clearing and settlement system on a net basis. The securities cash leg in euros will continue to be settled in the

BI-REL system; this proves the pivotal role played by the systems operated by the Bank of Italy within the overall Italian payment infrastructure.

On completion of this process of change, the Bank of Italy will no longer act as manager of the securities clearing and settlement procedure. It will, however, remain responsible for both BI-REL and BI-COMP. In addition to the daily management of these two systems, the Bank is charged with monitoring their functioning and ensuring their efficiency, reliability and stability. In doing so, it observes the standards laid down by the BIS and the ECB and sets out its policy in conformity with these standards and international best practices. Following the approval of the Core Principles for Systemically Important Payment Systems by the Governors of the G10 central banks, the Bank of Italy carried out an IMF ROSC exercise which showed that BI-REL was compliant with the Core Principles. The Bank also conducted an analysis to assess the risks associated with BI-COMP; the findings were that this system should not be regarded as systemically important and that it is in any case compliant with most of the Core Principles.

In recent years great importance has been attached to improving the efficiency of the two systems by introducing new technology for routing payments and by further increasing their accessibility to foreign intermediaries (see Section 3.2.8). The introduction of the euro and the resulting boost to the integration of European financial markets led the Bank of Italy to reassess the range of financial services it traditionally offered to its foreign correspondents, primarily non-euro area financial institutions. Among these services, the Bank of Italy provides a gateway for correspondents to access TARGET and is about to develop a number of services related to cash management, the investment of reserves, securities custody and portfolio management.

1.3 The role of other private and public sector bodies

1.3.1 The Italian Bankers' Association

The Italian Bankers' Association (ABI) is a representative body for the whole banking system and is responsible for coordinating interbank agreements and establishing uniform operational and accounting methods in interbank relations; in conjunction with the Bank of Italy, it promotes the widest possible involvement in interbank initiatives and the dissemination of information.

1.3.2 The Interbank Convention on Automation

The Interbank Convention on Automation (CIPA) is an interbank association whose primary concern is to plan initiatives in the field of interbank automation with particular reference to telecommunication systems and interbank applications. It also coordinates the implementation of joint projects, particularly with regard to the development of the payment system. CIPA comprises the Bank of Italy, which has the chair and provides the secretariat, the ABI, 79 banks and 16 bodies and companies working in the field of interbank automation.

1.3.3 The Authority for Information Technology in the Public Administration

The Authority for Information Technology in the Public Administration (AIPA) is an independent administrative authority which was established with the aim of increasing, in accordance with efficiency and security standards, the level of information technology within the public administration. The Bank of Italy and AIPA have worked together to analyse and solve problems connected to (a) the use and broadest diffusion of digital signature among payment systems users and (b) interoperability between banking and financial systems, other economic sectors and the public administration. The tasks and duties currently performed by AIPA have recently been assigned to newly established agencies within the Ministry for Innovation and Technology.

1.3.4 The Interbank Company for Automation

The Interbank Company for Automation (SIA), established in 1977 by CIPA, has the objective of providing, inter alia, operational support for the banking system's automation projects. It manages the national interbank network (RNI) and is responsible for the development and operation of an integrated system of services and procedures which constitute the technological platform supporting the payment system and the financial market. Recently, a project to integrate the RNI in SWIFT was

launched given the convergence of network systems towards internet protocols. At the beginning of 2000 the Bank of Italy completed the disposal of its stake in the SIA, which in 1999 had merged with CED-Borsa (a software company which manages stock exchange trading systems), thereby integrating the management of IT systems in market and settlement systems.

1.3.5 Monte Titoli

Monte Titoli is a company which provides central custody and administration of transferable securities (shares and bonds). Since 1986 the CSD's activities in private securities have been regulated by a specific law (see Law 289/86) making Monte Titoli the only company authorised to administer private securities.

In 1998, following the implementation of the CLFI, positive innovations emerged affecting the set of rules governing the CSD; in particular, the CSD is no longer considered to have a monopoly, because the CLFI reinforces the privatisation and liberalisation principle under which competition is enhanced (see Article 80).

In August 2000 Monte Titoli was authorised to manage government bonds, which until then had been managed by the Bank of Italy; the actual transfer of government securities from the Bank of Italy to Monte Titoli took place at the end of 2000. Therefore, there is now one single CSD that manages both private and government securities.

Dematerialisation has increased the importance of the CSD because ownership of the securities has to be proven by way of a book entry.

In October 2000 Monte Titoli was authorised to operate the Express real-time system, which, from the outset, has operated together with the LDT procedure (see Section 4.2.1). In October 2001, Monte Titoli presented to the Bank of Italy and Consob a project for a new netting system (Express II), which will replace the LDT. The project has been approved by the authorities and the new system should become operational in the second half of 2003.

1.3.6 The Cassa di Compensazione e Garanzia

The Cassa di Compensazione e Garanzia (CCG) acts as a clearing house and is responsible for the management of guarantee funds (see Sections 4.2.2 and 4.3.3).

1.3.7 The Companies and Stock Exchange Commission

The Companies and Stock Exchange Commission (Consob) plays a regulatory and supervisory role in regulated markets other than wholesale markets for government bonds. The aim of its supervisory responsibilities is the transparency of markets, orderly trading, and the protection of investors.

In accordance with the CLFI, Consob may give authorisation to market management companies, having verified the fulfilment of certain requirements (see Article 63), and it plays a supervisory role in regulated markets and market management companies (see Articles 73 and 74). In the event of serious irregularities in the management of markets or in the administration of management companies, and whenever necessary for the protection of investors, Consob adopts extraordinary measures to protect the market and management company from crises (see Article 75).

1.3.8 The market management companies

Market management companies have a number of regulatory and supervisory responsibilities. In accordance with the CLFI (see Article 64), market management companies shall: (i) provide the structures and services necessary for the proper functioning of the market; (ii) manage the market from an operational point of view; (iii) be in charge of admitting intermediaries and financial instruments to trading and excluding or suspending them from trading; and (iv) ensure compliance with any rules provided by insider trading laws (registration of operations and distribution of relevant information subject to public disclosure).

2. Payment media used by non-banks

2.1 Cash payments

Until 31 December 2001, the legal tender in circulation consisted of banknotes in seven denominations issued by the Bank of Italy (ITL 1,000, 2,000, 5,000, 10,000, 50,000, 100,000 and 500,000) and coins (around 2% of total legal tender) in eight denominations issued by the Ministry of the Treasury.

Until 28 February 2002 lira banknotes and coins circulated together with euro notes and coins; the latter have been the only legal tender in circulation as of 1 March 2002. At the end of 2000 the ratio of the stock of currency in circulation to GDP was 6.0% (5.9% in 1994).

Several factors foster the use of cash in Italy. The "grey economy" is still large and contributes to increasing the willingness to use cash for payments. Furthermore, certain areas of the country are characterised by a low degree of financial sophistication. On the supply side, the banking sector has built a widespread and cheap ATM network, which increases the number of cash withdrawals from current accounts. However, in recent years initiatives such as PagoBancomat (debit cards used at POS terminals) and the diffusion of credit cards have represented a break with past trends.

Other liabilities issued by the Bank of Italy

The Bank of Italy issues cashier's cheques for amounts of between EUR 500 and EUR 500,000 against cash payments for the corresponding amount. This instrument is also used for certain non-recurring payments carried out by the central bank on behalf of public entities (tax refunds and severance pay to central government employees).

Following reforms in the area of government payments, the use of such liabilities issued by the central bank is declining. In 2000 the Bank of Italy issued around 5.1 million cashier's cheques (against around 5.8 million in 1994) for a total value of ITL 24,886 billion (EUR 12,853 million).

In 1999 an electronic payment order procedure (EPOP) was launched so as to reduce the use of paper-based documents and to perform government payments via credit transfers.⁸ The progressive integration of the Ministry of the Treasury's payments into the interbank payment system is being pursued through the widespread use of interbank procedures.

2.2 Non-cash payments

In 2000, 44 transactions per capita⁹ were performed using instruments other than cash (36 in 1994). At the end of the same year, current accounts numbered 33.5 million, in comparison with 25 million in 1994 and 22 million in 1990. Moreover, the number of bank branches per 10,000 inhabitants amounted to 4.9 (while that of postal ones around 2.4).

According to the most recent survey, approximately 73% of Italian households have a bank current account and 11% a postal current account; the use of accounts differs enormously between northern and southern Italy. In northern Italy, the ratios are 89% and 9%, respectively, for bank current accounts and postal current accounts; by contrast, in southern Italy the corresponding figures are 44% and 17%.¹⁰ Bank instruments account for approximately 85% of the value and 64% of the volume of non-cash payments. Cheques and banker's drafts are the most commonly used bank instruments in Italy, but their importance is declining while that of direct debits, credit transfers and some types of cards for transactional purposes is growing. Payment cards account for only 21.3% of the volume of

⁸ EPOP is one of the most important innovations in government accounting. It represents the practical implementation of the automation of spending procedures set out in Presidential Decree 367 of 20 April 1994. In value terms, most of the orders settled in cash are for less than EUR 516; on the whole, the large majority of payment orders are for less than EUR 25,823.

⁹ Including RIBA, transactions per capita amount to 48 (see footnote 13).

¹⁰ Banca d'Italia, *Italian Household Budgets in 2000, Supplement to the Statistical Bulletin*, Rome, 18 January 2002.

non-cash payments;¹¹ however, in recent years the number and use of payment cards have been increasing (see Section 2.2.4).

2.2.1 Credit transfers

In 2000, there were 320 million bank credit transfers for a total value of ITL 8,732 trillion (EUR 4,510 billion). This instrument is widely used throughout the economy, even for retail transactions (eg direct crediting of wages, salaries and pensions).

The Bank of Italy has promoted a thorough overhaul of the circuit which provides for three specialised procedures handling retail, large-value and cross-border credit transfers. All three procedures allow for the settlement of transactions in central bank money and the execution of payments within predefined time limits.

The retail credit transfer procedure - launched in November 1994 for transactions of less than ITL 500 million (EUR 258,000) - settles transactions through the retail subsystem of BI-COMP (see Section 3.3.2). The ABI's regulations provide for maximum payment execution times, ranging from same day execution for urgent credit transfers initiated before 11 am (quite expensive and representing only a marginal share) to up to four days for ordinary credit transfers.

The large-value credit transfer procedure, handling transactions of over EUR 258,000, settles through the BI-REL system on the centralised accounts at the Bank of Italy (see Section 3.2).

Since 1999 the cross-border credit transfer procedure, which was designed mainly for large-value payments, has allowed for the transfer of customers' funds through the TARGET system for payments within EU countries. However, a large number of cross-border transactions are still executed and settled through banks' correspondent accounts.

Analyses conducted by the Bank of Italy on data collected among banks (at head office as well as at local branch level) pointed out that further improvements to low-value domestic credit transfers could be made with respect to the following critical points:

- the quality of service offered to customers in terms of average execution time from originator (debtor) to receiver (creditor) - about four days - is not in line with the terms and conditions prevailing in interbank procedures;
- the existing disclosure rules and practices for domestic credit transfers are not sufficient to ensure comprehensive information for the customer. By contrast, the Directive on cross-border credit transfers (transposed into Italian law in July 2000) requires banks to give detailed ex ante and ex post information on cost- and time-related conditions applied to both payer and payee;
- the alternative dispute resolution mechanisms in place for cross-border credit transfers within the European Union, which ensure equal representation for all interests involved, could be extended to domestic credit transfers.

2.2.2 Bank cheques and banker's drafts

In 2000, 560 million bank cheques (including banker's drafts¹²), totalling ITL 2,196 trillion (EUR 1,134 billion), were drawn on bank customers' current accounts.

In recent years, interbank procedures for handling cheques have been revised. At present there is:

- a procedure for large-value cheques (over EUR 2,582) and large-value banker's drafts (over EUR 10,329); and

¹¹ Payments performed using bank and non-bank cards.

¹² The banker's draft is drawn by a bank and is similar to the traveller's cheque. It is issued solely by specially authorised banks for amounts deposited in cash at the time of issue or debited to the applicant's account. In 2000, banker's drafts represented 16% of all cheques, totalling ITL 544 trillion (EUR 281 billion), as against 26% and ITL 521 trillion (EUR 269 billion) in 1994.

- a procedure for low-value cheques (up to EUR 2,582) and banker's drafts (up to EUR 10,329).

Low-value cheques and banker's drafts (around 80% of all cheques processed) are handled through a truncation procedure, implemented in 1990, which replaces physical delivery with electronic interbank messages. Data on low-value truncated cheques are conveyed through the RNI at night (day T) and the cheques are settled through the clearing system the following day (T+1). Unpaid cheques must be notified within the following three days (T+4). In July 1999 the Post Office also adopted this procedure for postal cheques.

Despite these improvements, the time it takes for banks to credit funds to their customers remains significantly longer than should be needed following the reorganisation of the interbank circuit. The large number of days required for funds to be available on customers' current accounts remains a critical concern with regard to cheque payment services in Italy. Hence, cheques are still perceived as a risky means of payment involving higher levels of administrative costs and more implicit pricing than other non-cash payment instruments.

A survey was conducted in March 2001 on the cost of cheques and the time taken to credit them; the survey covered the entire Italian banking system. The average number of days required for funds to be available on customers' current accounts was approximately seven working days, or 10 days including the finality of the transaction. The charge implicit in the value date averaged four days, with differences between banks ranging from two to six days. This service could be improved upon both by reconsidering the conditions being applied and by introducing clear charging mechanisms.

2.2.3 Collection orders (direct debits and bank receipts)

Italian banks execute collection orders, mainly on behalf of enterprises and public utilities. These orders are originated by creditors and may be executed by debtors through different methods of payment; direct debits are carried out by means of preauthorised debits of payers' current accounts; collections of bank receipts are executed through other methods of payment (see below).

Direct debits totalled 326 million in 2000 (79 million in 1994) and are mainly used by firms to collect recurrent low-value payments (eg utility bills). Bank receipts are used by firms to collect trade and other credits. Bank receipts perform an economic function similar to bills of exchange, but do not have the same legal protection (eg they cannot be disputed); nevertheless, owing to a lower stamp duty and the implementation in the 1980s of the electronic bank receipt procedure (RIBA), bank receipts have gradually replaced bills of exchange. Although not included in the country and comparative tables, in 2000 approximately 243 million commercial bills and paper-based and paperless bank receipts were collected through the banking system; the share of RIBA increased from 38% in 1989 to 70% in 1994 and to 93% in 2000.¹³

Furthermore, over the last four years, a corporate banking procedure has been made available in response to firms' need to rationalise and reduce the cost of their banking transactions, a need which has been made more acute given that firms hold accounts at different banks. This new procedure enables businesses to transmit their payment and collection orders to banks online via a single institution which acts as an agent; in March 2001, 641 banks were involved, as against 270 at the end of 1995.

2.2.4 Payment cards

Debit cards

At the end of 2000 there were 21 million debit cards in circulation which could be used to execute both payments and cash withdrawals through a nationwide network of POS terminals and ATMs.

ATM transactions are processed through the retail subsystem and settled through BI-COMP.

¹³ Until 1999, country statistics included RIBA in "Other items".

The use of debit cards for withdrawals at ATMs is widespread and growing rapidly. In 2000, 528 million withdrawals (25 per card) were executed compared with approximately 100 million in 1990. The share of ATM transactions grew from 50% of overall cash withdrawals in the banking system in 1990 to 73% in 2000.

The use of debit cards at POS terminals is expanding rapidly. In 2000 over 317 million such transactions were effected compared with 5 million in 1990, thus representing an average annual growth of 47% over the last decade. The number of transactions per card rose from 3.9 in 1990 to 15.7 in 2000. PagoBancomat is the major nationwide debit card network (around 90% of domestic debit cards in circulation). At the end of 2000 the PagoBancomat trademark was shared by some 675 banks acting in close liaison; they can compete in offering payment services to their own customers, cardholders and retailers. The main features of this system are as follows: (i) the provision of a common infrastructure; and (ii) a single trademark and a common set of rules and standards established by the ABI and the Convention for the Management of the Bancomat Trademark (CO.GE.BAN), which are responsible for organising and operating network facilities.

Credit cards

Credit cards are not widely used in Italy in comparison with other European countries; however, in recent years growing competition among suppliers of payment services and changing consumer habits have led to an increase in both the number of credit cards and their usage. At the end of 2000, 17 million credit cards issued either by banks or by non-bank companies (travel and entertainment cards) were in circulation, as against 4.5 million in 1990. Nevertheless, in 2000 only 55% of credit cards in circulation were used at least once over the year. In the same year, the number of credit card operations totalled 272 million, or 16 operations per card in circulation.

A more widespread use of credit cards is still being hampered by ATM cash withdrawals and gaps in services in various parts of Italy. In 2000 the value of ATM cash withdrawals as a share of GDP per capita represented around 7.7% compared with 2.2% for credit card expenditures. Moreover, the percentage of credit card transactions performed in southern Italy is almost half that of northern Italy; the same discrepancy was noted in 1990.

In the area of credit cards there are two main initiatives. Since 1968, a single bank has been able to issue a card linked to the Visa circuit. Since 1985, it has been possible for cards to be issued on a cooperative basis by Servizi Interbancari, a company owned by approximately 140 shareholders, most of which are banks. Around 800 banks are currently taking part in the latter scheme, which represents the major nationwide credit card network (in both the issuer's and the acquirer's market) and is linked to both Visa and MasterCard. In recent years, a number of individual banks have launched proprietary cards directly linked to international circuits. Travel and entertainment cards are issued by American Express and Diners Club.

E-money and card payments over the internet

A number of new initiatives are currently emerging aimed at developing payment services and instruments for use on open networks. Since July 2002, eight schemes have been operating and further schemes have been submitted to the Bank of Italy for evaluation; these new products call for an overall assessment of the security, transparency and anti-money laundering aspects of electronic money transfers.

With reference to the security of payments via an open network, a survey of the leading issuers of credit cards revealed that, in the first two months of 2001, 15% of credit cards in circulation were used at least once for internet, mail or phone purchases of low-value goods. Moreover, research carried out on the "charge-back"¹⁴ facility revealed that the majority of charge-backs are related to remote credit card transactions (the internet, MO/TO), mainly for "unauthorised" transactions.¹⁵

¹⁴ The "charge-back" facility is the technical term used by international card schemes to describe the refund process involved in respect of a transaction carried out using a card following the violation of a rule.

¹⁵ Charge-backs are declining due to improvements in the administrative and technical procedures (eg better e-merchant selection, use of pseudo card numbers and card verification value).

According to a study carried out by the Bank of Italy, in February 2000 fewer than 130 banks were offering their customers payment services through the internet. In relation to the overall supply of banking services via the network, which consisted mainly in securities trading on behalf of customers, payment system operations accounted for around 13% in value and 21% in volume.

ATM and POS networks

In recent years both the ATM and POS networks have grown rapidly. ATMs numbered 31,720 at the end of 2000; the number of ATMs per branch rose from 0.55 in 1990 to 1.13 in 2000. Currently over 90% of ATMs are interconnected within the nationwide network (Bancomat). All banks located in Italy which comply with Bancomat's rules are eligible for membership.

POS terminals totalled 571,000 at end-2000, compared with 22,000 at end-1990. However, their use is still limited (1,002 operations per terminal per year) in comparison with other industrialised countries and domestic ATM cash withdrawals (around 16,500 operations per ATM terminal per year at end-1999). Most POS terminals are linked to the PagoBancomat network.

2.3 Recent developments

The Bank of Italy, together with the banking and financial community, is engaged in further initiatives to improve the efficiency of payment instruments and to rationalise the payment system by correcting distortions. The objective is to facilitate the transition towards the most efficient instruments for each type and size of transaction.

The Italian banking community committed itself to speeding up the process towards a definition of the conditions for creating a Single Euro Payment Area (SEPA). Preliminary initiatives have concerned the infrastructure arrangements (eg STEP2), the governance structure and the diffusion of standards and rules for straight through processing,¹⁶ including enhancing interfaces with customers.

With regard to other means of payment, two new projects are being developed. With a view to improving security in credit card transactions and offering new services to customers, the ABI has established a specific department with the task of creating a microchip card in which the functions of credit and debit cards are embedded; the migration to EMV microchip cards is currently being tested in the test phase and will be completed by the end of 2005. In the area of interoperability in general, the Bank of Italy has acted to promote the integration of electronic identity cards with bank and postal microchip cards.

In the field of central government payments, the Bank of Italy, in cooperation with AIPA and other public bodies, is trying to take advantage of the opportunities offered by the progress being made in online information technology. The integration of the public administration network with the RNI permits the use of electronic payment orders for all payments made by central departments of the public administration and their local units.

3. Interbank clearing and settlement systems

3.1 General overview

The current structure of the Italian payment system is the outcome of two far-reaching reforms implemented in the 1980s and 1990s. An additional round of reform is currently under way.

The first reform, dating back to the end of the 1980s, had two main aims: (i) promoting settlement in central bank money by reducing recourse to correspondent accounts; and (ii) boosting the efficiency of payment instruments. These goals were achieved by implementing automated interbank procedures - specialised according to the type of transaction (credit transfers, cheque truncation, etc) - which

¹⁶ In the first half of 2001, Italian banks completed the assignment of international bank account numbers (IBAN) to customers.

envisage common standards and a maximum time limit for the execution of payments. In addition, greater use of the clearing and settlement system operated by the Bank of Italy was promoted.

The second reform, introduced in the mid-1990s, was directed, above all, at minimising systemic risks in an environment characterised by a substantial rise in the volume of transactions, which were mainly settled on a net basis. This objective was pursued through the implementation of the two specialised systems: BI-REL for large-value payments and BI-COMP for retail transactions. Both systems are managed directly by the Bank of Italy. The distinction between retail and large-value payments is not based on the value but on the operating procedures with which the transactions are handled; payments using the same operating procedure are all settled in the same circuit. Following the start of monetary union, BI-REL became the domestic component of TARGET.

In the light of these reforms, interbank payments settled in central bank money increased significantly from six times GDP in 1988 to 40 times GDP in 1998. Following the start of EMU, the reduction in foreign exchange transactions has led to a fall in interbank payments compared with the previous year. In 2001, interbank payments were 33 times GDP. In the same year, transactions settled on a gross basis accounted for 88% of total payments.

The Italian clearing and settlement system is currently characterised by high levels of reliability and efficiency ensured by widespread automation. A crucial role in payment processing has been played by the RNI, which provides the technical infrastructure for the exchange of accounting information relating to payments carried out by banks amongst themselves and between themselves and the Bank of Italy. Open, flexible and non-discriminatory access to the systems fosters a high level of competition among intermediaries. Particular attention has been paid to promoting the participation of foreign intermediaries in the Italian payment system. To this end, access to BI-REL on a remote basis through the use of the SWIFT standard was implemented in November 2000.

The increase in competition between financial centres in the euro area and advances in technology have spurred the Bank of Italy to undertake an important project (New BI-REL) to further improve the efficiency of the BI-REL system, thus strengthening the competitiveness of the Italian marketplace and meeting users' needs. To this end, new facilities will be introduced which will allow participants to have services tailored to their needs. Further opening of the system to foreign participants will be achieved through the migration of domestic and cross-border transactions to the SWIFT network and the adoption of internet technology. The new system will be implemented gradually, and its launch is scheduled for June 2003 (see Section 3.2.8).

As regards retail payments, planned changes are directed at improving the efficiency of payment instruments in terms of both charges and speed of execution. In this respect, the possibility of settling payments on a same day basis is under analysis.

3.2 Real-time gross settlement system

BI-REL was conceived in close liaison with the banking community and came into full operation in 1998. With the setting-up of BI-REL - which increases the use of central bank money for the settlement of interbank payments - the goal of enhancing the stability of the payment system as a whole has been achieved. Similarly, the possibility of settling payments in real time has contributed to heightening the efficiency of the payment services provided by banks to their customers. The twofold objective of ensuring the orderly and smooth functioning of BI-REL and limiting the liquidity costs for intermediaries has been attained by providing the following facilities: (i) intraday liquidity to intermediaries in the form of fully collateralised daylight overdrafts; and (ii) a queuing mechanism for temporarily uncovered payments.

3.2.1 Operating rules

In BI-REL, all payments are settled continuously and individually through the centralised accounts held by intermediaries at the Bank of Italy. The system guarantees the final and irrevocable settlement of payments.

Each centralised account is composed of reserve and overdraft sub-accounts. Since January 1999 the accounts have been denominated in euros. Payments are settled by making use of the liquidity available in both these accounts and by using an automatic mechanism without any need for intra-account transfers. More specifically, the debiting of payments takes place in the following order: first

the reserve account on the basis of the liquidity available (both voluntary reserves and minimum reserves), then the overdraft account. The crediting of payments is carried out in the reverse order.

According to the harmonisation principles laid down for TARGET, intraday liquidity - which is unlimited but fully collateralised - is provided by the Bank of Italy free of charge; remote participants are not eligible for intraday liquidity, nor do they have access to the marginal lending facilities. With a view to improving the efficiency of banks by using intraday liquidity, banks can transfer securities in real time from their centralised securities accounts to the Bank of Italy's securities account at Monte Titoli.

Another important facility which contributes to increasing the system's overall efficiency is the queuing mechanism for payments temporarily without cover. It has been designed to enhance the flexibility of the system by relieving banks of the need to re-enter payments into the system. Payments entered into the system are channelled according to an order of priority automatically determined by BI-REL: high priority is given to clearing balances, transactions with the Bank of Italy and other NCBs or the ECB, and operations by the Bank of Italy (such as monetary policy operations, the cash leg of securities transactions and multilateral balances generated by BI-COMP); medium priority is given to transactions on e-MID; and ordinary priority is given to other interbank payments. Within the order of priorities, payments are executed on a first in, first out (FIFO) basis. At the end of the day, the first available, first out (FAFO) mechanism is activated automatically a few minutes before the cancellation of queued payments, in order to minimise the number of payments deleted (see Section 3.2.4).

BI-REL allows intermediaries to have information on queued payments. The information given to a participant on its debit positions in the queue is detailed (in chronological order, stating the amount and the counterparty, etc) so as to allow for the correct scheduling of transfers. With regard to incoming payments, the recipient bank is currently allowed to see only the total amount and the number of payments.

The BI-REL system uses the RNI. As from November 2000 it has also been possible to access BI-REL via SWIFT, which links the system participants directly to the Bank of Italy. With a view to ensuring the exchange of payments among intermediaries who use different systems (for instance, the originator uses SWIFT and the recipient uses the RNI or vice versa), BI-REL provides a SWIFT-RNI protocol conversion service free of charge. With the start of the upgraded system (New BI-REL), the new SWIFTNet network based on the TCP/IP transmission protocol will be used (see Section 3.2.8).

3.2.2 Participation in the system

Participation in BI-REL is open to banks, investment firms, organisations providing clearing and settlement services and public sector bodies. In order to be able to participate in the system, the participant must hold a settlement account at the Bank of Italy and comply with the access criteria set out in the TARGET guideline. At the end of 2001, 681 intermediaries were participating in BI-REL, of which 671 were credit institutions and 10 non-banking institutions. Foreign institutions established in a country belonging to the European Economic Area may have remote access to BI-REL via SWIFT. They are simply required to open a settlement account with the Bank of Italy and to provide the latter with legal opinions.

Participation in BI-REL is characterised by a high level of flexibility: each participant is able to extend the possibility of using its settlement accounts to other participants through an agency agreement (co-management), but it shall retain full responsibility in respect of being the owner of the accounts. It is also possible to exchange payments directly through the interbank procedures and confer upon another intermediary the right to settle such payments (so-called indirect participation).

3.2.3 Types of transactions handled

According to the specialisation principle, the following transactions are settled in BI-REL: (i) large-value domestic payments; and (ii) cross-border payments within TARGET, regardless of their value. In particular, the payments settled include: (i) transactions carried out directly by participants through SWIFT or the RNI; (ii) the multilateral balances generated by BI-COMP for domestic retail payments; (iii) the multilateral balances from the clearing and settlement services of transactions in financial instruments (see Section 4.2.1); (iv) the cash leg of securities transactions, including monetary policy operations settled on a real-time gross basis by using the DVP system (Express procedure - see Section 4.3.1); (v) transactions concluded on e-MID (see Section 3.2.9); (vi) direct interbank external euro payments and the euro leg of foreign exchange transactions (GEC); (vii) large-value domestic credit transfers (BIR); (viii) external payment orders for cross-border credit transfers (BOE); and

(ix) cross-border transactions via TARGET, including the multilateral balances denominated in euros stemming from the Continuous Linked Settlement system (CLS).

3.2.4 Operation of the transfer system

The working hours of the BI-REL system are fixed at the European level and are the same as those of TARGET (from 7 am to 6 pm CET). BI-REL's operational day is divided by five cutoff times, of which the first two are domestic while the others are laid down in the TARGET guideline:

- (1) Cutoff (12 noon) for settlement of the multilateral balances generated by BI-COMP for retail payments.
- (2) Cutoff (12.30 pm) for settlement of the cash leg of securities transactions originated by the LDT procedure.
- (3) Cutoff (5 pm) for entering payments on behalf of customers (domestic and cross-border). The FAFO mechanism used to optimise the settlement of queued cross-border customer payments starts operating. After this process, uncovered customer cross-border payments are cancelled.
- (4) Cutoff (6 pm) for executing interbank transactions (domestic and cross-border) and start of the FAFO mechanism to optimise queued payments (domestic customer payments as well as domestic and cross-border interbank transactions). Uncovered payments are cancelled and will not be automatically re-entered the following day.
- (5) Cutoff (6.30 pm) for resorting to the standing facilities. If intraday liquidity is not paid, it is automatically transformed into marginal lending.

3.2.5 Transaction processing environment and settlement procedures

The flow of information in BI-REL follows a "V" pattern: the message linked to each payment is transmitted by the sending bank to the central bank and from the latter to the receiving bank, but only after cash availability has been verified and the sending bank's account has been debited. The same procedure automatically provides every operator with information on individual payments settled.

In BI-REL, each debt transaction is posted to the settlement account if funds (including intraday liquidity) are available; temporarily uncovered payments are channelled into the queues. Queued payments are not revocable except in the event of error; the cancellation of an interbank transaction is carried out by the Bank of Italy, the system manager, on the basis of a request from both counterparties. Obviously payments are not revocable once the debtor's account has been debited.

3.2.6 Credit and liquidity risks

Given that payments in BI-REL are settled one by one in central bank money and considering the very short settlement time (payments temporarily without cover wait, on average, less than 30 seconds), the credit risk is minimised. With regard to the BI-COMP and LDT clearing systems, given that the securities and cash accounts of the receiving institutions are credited only after checking the availability of funds in the accounts of the debit institutions, no fundamental risk occurs.

With a view to discouraging delays in the settlement of the netting systems, banks which are unable to settle their multilateral balances on time are penalised. In particular, banks are charged with: (i) penalties of EUR 500 for late settlement of the BI-COMP multilateral balances; and (ii) an ad valorem penalty for late settlement of the multilateral balance in the LDT procedure. In this respect, penalties applied may not exceed EUR 25,000. In the event of the insolvency of a participant in BI-COMP, new multilateral balances are determined by excluding the insolvent participant (unwinding). In the event of a participant's default in LDT, an unwinding procedure is applied, with the exception of listed equity transactions, the balances of which are covered by the guarantee fund managed by the CCG (see Section 4.3.3).

3.2.7 Pricing

In accordance with the principle established at the Eurosystem level, BI-REL's pricing policy aims to cover the cost of services offered. The fees charged consist of an annual fee of EUR 1,500 and a

transaction fee of EUR 0.50 for electronic domestic payments (EUR 12 for paper instructions). For cross-border payments, fees are those established at the European level for TARGET. Transaction fees are charged to the sending bank.

3.2.8 New BI-REL

New BI-REL, whose strategic and operational guidelines were formulated together with the Italian banking community, is aimed at implementing a system characterised by enhanced service levels, higher flexibility in handling payments, increased standardisation and fully automated payment procedures (straight through processing, STP). The new system will go live by the second half of 2003.

In particular, New BI-REL will provide the following facilities:

- (1) The liquidity reserve for settlement of the multilateral clearing balance stemming from the overnight cycle of the securities settlement system (Express II - see Section 4.3.2) and that for urgent payments.
- (2) New interactive services whereby participants, in addition to the usual enquiries regarding status of payments and accounts, can: determine the urgency of a payment at the time of entry; modify the priority of a queued payment or cancel it from the queue; modify the amount of liquidity reserve in real time; and make enquiries about incoming domestic payments in other participants' queues. The interactive services of New BI-REL represent a major change in payment system arrangements. The system goes beyond the mere information function to allow for direct interaction with the settlement system, without the mediation of the Bank of Italy. As the time factor is of ever increasing importance, participants will have a means of flexibly managing payment flows and rapidly resolving any payment emergencies.
- (3) Optimisation of payments with a view to simultaneous bilateral settlement of individual payments in participants' queues, after verification of settlement account balances. This function is applied automatically throughout the operating day in order to reduce intraday liquidity needs and cut transaction settlement times.

As for technology, New BI-REL will be completely open to the SWIFT infrastructure. The use of SWIFT international standards for the messages carrying payment instructions guarantees a high degree of automation. For domestic interbank transactions the system will use SWIFT's FIN Copy service, with the Y-Copy transmission mode ensuring confidentiality of the commercial information in the messages. The new SWIFTNet network will also be adopted, based on the TCP/IP transmission protocol used for the internet. This will provide participants with the interactive functions in real time, via two further SWIFT services: Browse, essentially for data enquiry, and InterAct, for operational actions such as modifying queued payment priorities or the size of one's liquidity reserve.

3.2.9 The screen-based market for interbank deposits

An important role in the distribution of liquidity is played by e-MID, which is the main Italian uncollateralised money market. e-MID is organised and managed by e-MID SpA, a private company currently owned by 40 banks and financial institutions. The average daily traded volume was EUR 15.4 billion in 2001 and around EUR 17.3 billion in the first six months of 2002. The market has been continuously growing as an international market and it has now become one of the leading European money markets; in the first half of 2002 the market share of non-resident banks amounted to around a 17% share of the entire market.

At the end of 2001, the market had 192 members, both Italian and foreign. Financial intermediaries eligible to participate in e-MID are: Italian banks, foreign branches of Italian banks, EU banks, branches of EU banks established in the European Union, non-EU banks and branches of non-EU banks established in the European Union.

Trades between participants holding an account at the Bank of Italy are settled automatically via BI-REL; in other cases deals are settled semi-automatically via TARGET. For this reason, in order to be admitted to trading, a financial intermediary must participate in the Italian real-time gross settlement system, or in another RTGS system. When banks - carrying out transactions on e-MID - participate in the BI-REL system, payment orders are automatically sent to such a system; the debiting and crediting of settlement accounts, therefore, take place in real time (automatic settlement model). When one of

the two banks involved, or both, participate in other RTGS systems (cross-border payments), the e-MID system sends payment notices to the bank which is obliged to pay and the latter has to forward the payment to its RTGS system (semi-automatic settlement model).

Four different types of contracts can currently be traded on e-MID: overnight, tomorrow next, spot next and time deposits. Four fifths of funds are negotiated overnight and the interest rate on this maturity is strictly correlated to the EONIA. Participants may display bid and offer quotes. When an application is received for a bid quote (request of funds), the contract is automatically executed, while an application for an ask quote may be rejected by the bank offering funds. In addition, e-MID SpA has developed e-MIDER, the electronic market for EONIA swaps, and provides its members access to the MTS repo platform.

The electronic trading platform which supports the market offers important advantages in terms of transparency and efficiency: at any time each participant can view all the current buy and sell proposals. Thanks to its high liquidity, bid-ask spreads are very narrow, especially on the most liquid maturities.

3.3 Retail payment system

Following the reform of the Italian payment system implemented in 1998, retail payments are now handled by the BI-COMP system, which is composed of two subsystems: the local clearing subsystem for paper-based transactions, and the retail subsystem for paperless transactions. On average, BI-COMP handles around 4 million payments a day (amounting to around EUR 8 billion).

With a view to reducing the settlement risks in BI-COMP, as from the end of 1998 all cash balances in the LDT procedure (see Section 4.2.1) were moved from BI-COMP to BI-REL, where they are directly settled in central bank money.

With regard to participation in the BI-COMP system, access is restricted to banks, the Postal Administration, the Bank of Italy and the Ministry of the Treasury. Participation in BI-COMP may be direct or indirect.

3.3.1 The local clearing subsystem

The local clearing subsystem is managed by the Bank of Italy. It handles paper-based operations requiring the physical exchange of items (ie non-truncated bank cheques, banker's drafts, bills and postal instruments). The accounting information on paper-based transactions is posted by means of the RNI or a floppy disk, thereby making it possible to automatically determine the multilateral balance of each participant.

With a view to rationalising the exchange procedures and meeting the needs of the banking system, since 1998 the exchange of paper-based transactions has been concentrated within two clearing houses (located in Rome and Milan) instead of being handled at each branch of the central bank as was previously the case.

3.3.2 The retail subsystem

The retail subsystem - managed by the SIA on behalf of the Bank of Italy - handles low-value paperless payments. It includes a set of procedures, geared to the type of payment, which operate on the RNI. The procedures cover: Bancomat operations, truncated cheques, electronic collection orders (RIBAs), direct debits, and retail credit transfers (eg of below EUR 258,228). The procedures are managed by service providers, or *centri applicativi*, which are bank-owned software companies that carry out a number of activities on the banks' behalf in connection with the exchange of accounting information on interbank payments. There are four service providers operating in a competitive environment. Each bank is free to choose the service provider through which to channel payments.

The accounting information is exchanged in standardised electronic format without the physical exchange of items. With regard to the settlement of these payments, each service provider calculates the net bilateral balances for each procedure and sends this information to the retail subsystem. The retail subsystem, in turn, calculates an aggregated bilateral balance which is posted to BI-COMP. Then, a multilateral balance for each participant is determined in the BI-COMP system by summing up

the balances of both the retail subsystem and the local clearing subsystem. The multilateral balance is eventually settled in BI-REL.

4. Securities settlement systems

4.1 Trading

4.1.1 The wholesale screen-based market for government securities

The MTS market is organised and currently managed by MTS SpA, a company founded in 1998 when the market was privatised; the company's capital is held by major national and international financial institutions.

Eligible participants in the MTS are banks and financial institutions which are committed to providing liquidity to the market on a continuous basis. There are two types of participants: primary dealers and dealers.

Primary dealers can make proposals and act on other participants' proposals quoted on the MTS. They are committed to making two-way quotes on a selected group of government bonds; they must also meet the minimum capital and trading requirements. Dealers can only act on proposals quoted on the MTS. The minimum capital and trading requirements which they are obliged to meet are less stringent.

Proposals are anonymous. Participants become aware of the identity of trade counterparties only after the execution of the trade. For this reason, a dealer willing to buy (or to sell) a bond cannot choose his counterparty, but is forced to trade at the best price available; this means that counterparty risk is managed not on a bilateral basis but according to market membership criteria.

MTS-Italy provides an electronic trading platform which offers major benefits to members and issues from the Ministry of the Treasury in terms of straight through processing capabilities, reduced transaction costs, market transparency, efficiency and liquidity.

Four different Italian government bonds are traded on the MTS: Cct (floating rate certificates), Btp (fixed rate bonds), Bot (Treasury bonds) and Ctz (zero coupon securities). In addition, selected eurobonds can be traded. The minimum trade size is currently EUR 2.5 million (EUR 5 million for benchmark bonds).

MTS-Italy also has an electronic market for repurchase agreements (PCT), allowing participants to manage their liquidity positions and their securities portfolios more effectively.

Two types of contracts can be concluded on the PCT: (i) special repos, where a specific security is named; and (ii) general collateral repos, where the security is identified only at the end of the trading day.

There is no distinction of roles among participants and there are no quoting obligations.

The type of repurchase agreements negotiated are buy-sellback agreements, which signifies the transfer of all ownership rights to the buyer. All securities traded on the MTS may be the object of repurchase agreements on the PCT. Proposals are not anonymous; trades can be made at any price quoted on the market, even if not the best available.

Finally, MTS-Italy has a grey market where it is possible to trade Italian government bonds for which the Ministry of the Treasury has announced the auction but which have not yet been issued. Securities are negotiable on the MTS grey market until the day on which the auction takes place. The following day, the securities begin to be traded on the cash market.

As from December 2002, MTS members will be offered a new central counterparty service.

4.1.2 The Italian Stock Exchange

The Italian Stock Exchange is a regulated market for trading investments and has been managed by Borsa Italiana SpA since 2 January 1998. Borsa Italiana SpA is a private company whose

shareholders include banks, investment funds, issuers and other market players. The stock market company provides for the organisation and smooth functioning of the market; it also ensures that companies and intermediaries comply with entry requirements and that operators comply with market rules. It carries out market surveillance and organises company announcements.

The Italian Stock Exchange runs various markets: the stock market (MTA); the Mercato Ristretto (restricted market), where ordinary, preference and saving shares, convertible bonds, issue rights, warrants, covered warrants and closed-end funds are traded; the new market for shares of high-growth companies; the market for equity derivatives (IDEM) for futures and options on relevant indices and stocks; the Italian futures market (MIF), for futures contracts on government securities, interest rates and options; the retail government and corporate bond market (MOT); and the market for traditional options on equities (MPR).

Since July 1994, shares, warrants, options and convertible bonds quoted on the Italian Stock Exchange have been traded in an electronic trading system. This system consists of a computer network which matches up supply and demand for financial instruments.

In the course of 2000, the main developments in the Italian Stock Exchange were the introduction of EuroMOT, a new regulated market organised and managed by Borsa Italiana and specifically designed for eurobonds, foreign bonds and asset-backed securities. In May 2000 Borsa Italiana introduced "Trading After Hours", a regulated market aimed at satisfying the demand for trading after the market's normal closing times. In June 2000 the Italian Stock Exchange launched a new derivatives contract, the mini-FIB, the first IDEM product aimed primarily at private retail investors. It is a derivatives contract on the MIB 30 index (the top 30 blue-chip index) one fifth the size of the existing MIB 30 futures contract (FIB 30).

4.2 Clearing

4.2.1 *Securities net settlement procedure*

The technical infrastructure for securities clearing and settlement is provided by a nationwide net settlement system, the LDT procedure, which is managed and owned by the Bank of Italy. The main regulations governing the LDT are contained in measures which were adopted by the Governor of the Bank of Italy in April 1997 and September 2000 in agreement with Consob; the operational features are set out in an agreement to which participants must subscribe.

According to the measure adopted by the Governor of the Bank of Italy in September 2000, access to the LDT procedure is restricted to banks, investment firms authorised to provide investment services in Italy, Italian stockbrokers, CSDs and institutions which operate SSSs or netting and guarantee systems as well as some public entities. Foreign participants may have access to the LDT on a remote basis. In particular, a foreign institution which acts as CSD or as operator of either an SSS or a netting and guarantee system may participate in the Italian securities settlement system, on a remote basis, provided it fulfils the following requirements: (i) it is subject to supervisory measures equivalent to those in force in Italy; and (ii) there is an agreement between the supervisory authorities in Italy and those in the foreign institution's country concerning the exchange of information and the adoption of reciprocal conditions.

Participants may clear and settle securities transactions both for their own account and on behalf of other authorised intermediaries. LDT participants may either settle their cash positions directly on their BI-REL accounts or appoint a bank participating in BI-REL to settle for them.

In December 2001, there were 278 intermediaries participating in the LDT procedure, including two major banks and five leading investment firms with remote access to the procedure.

The LDT procedure and the structure of the accounts of the CSD permit complete segregation between intermediaries' proprietary positions and those of their customers. They also allow settlement banks to manage the securities positions of each of their institutional customers separately, thus avoiding the risk of commingling.

The LDT procedure clears and settles the following types of transactions carried out on the official markets and over the counter:

- outright transactions and repos in Italian government securities carried out on the MTS;

- stock exchange transactions in equities, corporate bonds and Italian government securities; and
- outright and repo transactions in listed and unlisted securities carried out over the counter.

Bilateral net positions, once they are matched and corrected by the daily matching correction system (RRG), are automatically sent to the LDT procedure, which determines for each participant a multilateral balance for all types of securities handled and a single cash balance. At 8 am on the settlement day, the securities and cash positions are notified to participants. Until 12.30 pm participants can manage uncovered securities balances by means of transfers between accounts at the CSD. By the same deadline, it is also possible to reduce the multilateral securities balance by concluding assignments. The assignment procedure allows intermediaries with a securities shortfall to postpone delivery thanks to agreements with intermediaries which have creditor balances. Participants with a securities debtor balance which invoke the assignment procedure are required to pay a penalty for each type of security not delivered; the penalty consists of: (i) EUR 200 to defray expenses; and (ii) a surety deposit equal to 20% of the value of the undelivered securities. The surety deposit is fully redeemable upon delivery of the security within three trading days; otherwise a share of the deposit is subtracted therefrom.

At 12.30 pm securities balances are settled through book entries at Monte Titoli (see Section 1.3.5) and cash balances are automatically debited from participants' accounts with the Bank of Italy. The settlement mechanism provides a high level of protection against risks by complying with the DVP principle. In fact, the cash and securities credit balances are not processed until all debit balances have been posted.

Transactions concluded on regulated markets are settled on a rolling basis (T+3 for outright transactions and T+2 for repos, while those concluded on the OTC market are settled as agreed between the parties). In 1999 the possibility of settling with the same day value (T+0) was introduced for repo transactions in government securities (so-called overnight repos). Such a facility allows those intermediaries which have to deliver a specific government security to cover their position before the LDT procedure begins.

In the second half of 2003, the LDT procedure will be replaced by a new securities clearing settlement system operating on a net basis (Express II) and managed by Monte Titoli (see Section 4.3.2).

4.2.2 The guarantee systems for financial instrument transactions

Institutional aspects

The general regulation issued by the Bank of Italy, in agreement with Consob (see the legal provision of 5 November 2002 on the clearing and guarantee of transactions in financial instruments - derivatives and non-derivatives - under Articles 68, 69 (paragraph 2) and 70 of the CLFI), defines a general framework for guarantee systems for financial instrument transactions; this includes both the provision of central counterparty services and the management of guarantee funds.

The Bank of Italy and Consob approve the operational rules laid down by the companies managing these systems only after having verified that:

- the companies fulfil certain requirements (minimum level of capital, accounting and organisational segregation rules); and
- operational rules laid down by the companies comply with the regulations issued by the authorities and are likely to ensure the efficiency, soundness and stability of the system.

There is no specific authorisation for clearing houses and there is no approval of the appointment of clearing house managers. Central counterparty services can be provided for both securities and derivatives transactions.

Central counterparty services - operational aspects

Currently (November 2002), the CCG is the clearing house for one derivatives exchange, the IDEM, launched in 1994. It is planned that in a few months from now it will also act as CCP both on the wholesale market for government securities (MTS) and on the equity market.

The CCG's risk management procedure is mainly based on margins. There are also capital adequacy requirements for members. As far as margin requirements are concerned, the CCG uses the Theoretical Intermarket Margin System (TIMS) developed by the Options Clearing Corporation (OCC). The CCG monitors clearing members' positions on a real-time basis to assess exposure. Intraday margins may be requested; as part of the constant monitoring of clearing members' positions, additional intraday margins may be requested by the CCG where it considers the risk exposure of a clearing member to be too high.

4.3 Settlement

4.3.1 The Express procedure

As an alternative to the LDT procedure, transactions concluded on the OTC market may be settled using the Express procedure managed by Monte Titoli. Moreover, Express is used for the settlement of monetary policy operations. This procedure provides for real-time settlement on a gross-gross basis (DVP Model 1). The system settles transactions in equities, corporate bonds and government securities.

Institutional aspects

Security settlement systems are now governed by a general regulation issued by the Bank of Italy in agreement with Consob (see the legal provision of 8 September 2000 on the clearing and settlement of transactions in non-derivative instruments under Article 69 of the CLFI).

The new regulation identifies the categories of direct participants and the general management criteria for the settlement of securities. Specific risk management measures must be adopted, such as intraday finality, a queuing mechanism, a reduction in the time elapsing between the collection of data regarding transactions and settlement, minimum requirements in terms of risk containment and the finality of transactions settled. Moreover, operating hours must be consistent with those of BI-REL.

Operational aspects

According to the general regulation on securities settlement systems mentioned above, Express participants are banks, investment firms, the Bank of Italy, CSDs, SSSs, clearing houses and other minor entities.

As part of the Express procedure, securities are settled in participants' accounts at Monte Titoli, whereas cash is settled in the participants' accounts in BI-REL. The system benefits from the intraday credit mechanism used by BI-REL. The Express procedure offers a DVP intraday finality facility and, in order to be able to provide a straight through processing service, it is connected to the RRG-REL, a matching system developed by SIA.

The settlement procedure of the securities leg consists of the following steps:

- Express receives matched transactions from the RRG-REL and gives a reference number to each of them;
- for every transaction, Express checks the securities account balance of the seller, reserves the securities and sends information to BI-REL for the cash settlement; and
- if the securities are not available on the seller's account, Express starts the queue management process. Queued transactions are periodically processed in the following order of priority: monetary policy operations; priority input by the intermediary; matching time (FIFO); and stockbuilding on the seller's securities account (FAFO).

The settlement stages of the cash leg are as follows:

- BI-REL checks the cash account balance of the buyer, settles the cash leg and sends information to Express, which settles the securities leg using the reserved securities;
- if funds are not available in the cash account, payments are queued.

As far as indirect cash settlement is concerned, participants in Monte Titoli are allowed to settle their cash positions by means of a settling bank; Express offers cap management mechanisms to settling banks in order to keep their funds exposure under control.

4.3.2 The Express II project

In the second half of 2003 the LDT is expected to be replaced by a new net settlement system managed by Monte Titoli, named Express II.

Express II will be a multicurrency clearing and settlement system supported by automatic cash and securities lending facilities. It will consist of two components: the first will settle transactions on a net basis in the initial phase of the settlement day; and the second, coinciding with the current Express gross settlement system, will handle transactions not settled during the net cycle as well as those that intermediaries will directly submit to gross settlement. The objectives of the creation of Express II are: moving up transaction settlement to the early morning; concentrating operations during night-time; facilitating the handling of settlement fails, in part by means of a daytime netting cycle; and permitting efficient utilisation of intraday credit granted by the central bank.

4.3.3 The guarantee systems

There are currently two guarantee funds aimed at securing, respectively, the performance of securities transactions in listed equities and their settlement (see Articles 68 and 69 of the CLGI). The former, the transactions performance fund, is currently regulated by the Italian Stock Exchange, but the regulatory framework will be replaced by a new one, in accordance with the general regulations issued by the Bank of Italy and Consob on 5 November 2002; the latter, aimed at ensuring timely settlement in listed equities, is regulated by the Bank of Italy in agreement with Consob.

Both trading and settlement guarantee fund are managed by the CCG, which, in this case, is not a central counterparty and is not responsible in respect of its own assets for the default of a clearing member. The CCG's assets are segregated from those of the funds.

As far as the settlement guarantee fund is concerned, each member is requested to pay margins to the fund in relation to its activity in terms of the turnover of securities settled during the last two months.

Should a participant in the LDT default, the CCG would replace it in the settlement of listed equities. In doing so, according to the general rules issued by the Bank of Italy and Consob, the CCG would first use the margins posted by the defaulting participant, and then the survivors' margins, making it possible to close the settlement procedure. The losses arising from the CCG's intervention are shared among participants, in proportion to their turnover activity.

4.4 The use of the securities infrastructure by the central bank

As regards monetary policy operations, the settlement of open market transactions is completely automated through the DVP procedure, Express (see Section 4.3.1).

Once the cash and securities positions for each bank are calculated by the Bank of Italy, the relevant information is transmitted to Monte Titoli. In the event that the settlement day of a refinancing operation coincides with the reimbursement day of previous open market operations, credit and debit positions are netted by the Bank of Italy so as to calculate each intermediary's netted securities and cash positions.

Where domestic securities are used for such transactions, the automatic entering of the cash and securities positions into the Express procedure ensures the real-time settlement of both legs. In particular, the cash leg is settled through the accounts held at the central bank (in the BI-REL system); the securities leg is settled by way of book entries on the accounts held by the Bank of Italy and other counterparties at Monte Titoli. In the case of foreign securities, the Express procedure is used if the security concerned is managed by Monte Titoli through cross-border links. Otherwise, the Correspondent Central Banking Model (CCBM) is used.

As far as the use of securities as collateral for intraday liquidity is concerned, an automatic procedure allows intermediaries to transfer securities in real time during the course of the operational day from their accounts to the Bank of Italy's securities accounts at Monte Titoli. The amount of intraday liquidity available in BI-REL for each intermediary automatically varies according to the collateral at its disposal. The same procedure is used for the marginal lending facility. Such a procedure allows for a high level of flexibility in the management of collateral, enabling the amount held by intermediaries to be optimised in accordance with the real liquidity needs.

The management of collateral for each intermediary is carried out by the Bank of Italy and consists in: (i) evaluating securities; (ii) applying the initial margin; and (iii) verifying collateral adequacy on a daily basis.

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List of abbreviations

ANSER	Automatic answer Network System for Electrical Request
BANCS	Banks Cash Service
BCCS	Bill and cheque clearing system
BOJ-NET	Bank of Japan Financial Network System
CAFIS	Credit and Finance Information System
CAPTAIN	Character and Pattern Telephone Access Information Network
CAT	Credit authorisation terminal
CMS	Cash Management Service
DDX	Digital data exchange
FB	Financing bill
FB	Firm banking
FSA	Financial Services Agency
FXYCS ¹	Foreign Exchange Yen Clearing System
JASDEC	Japan Securities Depository Centre
JB Net	Japan Bond Settlement Network
JGB	Japanese government bond
JSDA	Japan Securities Dealers Association
MICS	Multi Integrated Cash Service
NCL	Net credit limit
PTS	Proprietary trading system
RC	Relay computer
SPDC	Simultaneous processing of DVP and collateralisation
TB	Treasury bill
TBA	Tokyo Bankers Association
TIFFE	Tokyo International Financial Futures Exchange
Zengin System	Zengin Data Telecommunication System

¹ The abbreviation of the Foreign Exchange Yen Clearing System has been changed from FEYCS to FXYCS.

Introduction

There are four major payment systems for clearing and settling interbank payments in Japan - three clearing systems in the private sector and a funds transfer system operated by the central bank. The three clearing systems are: the Zengin Data Telecommunication System (Zengin System), which clears retail credit transfers; the Foreign Exchange Yen Clearing System (FXYCS), which clears mainly yen legs of foreign exchange transactions; and bill and cheque clearing systems (BCCSs), which clear bills and cheques presented at regional clearing houses. The BOJ-NET Funds Transfer System is the central bank's funds transfer system and is used to settle interbank obligations including net obligations of participants in the private sector clearing systems.

There have been several notable developments in the respective payment systems in this decade. Both the Zengin System and the FXYCS have introduced countermeasures against credit and liquidity risks involved in clearing and settlement procedures, and the Bank of Japan Financial Network System (BOJ-NET) introduced a new real-time gross settlement (RTGS) system in 2001.

Concerning securities settlement systems, the Bank of Japan serves as the central securities depository (CSD) for Japanese government bonds (JGBs), and the Japan Securities Depository Centre (JASDEC) is the CSD for stocks. A number of registrars and the Japan Bond Settlement Network (JB Net) make up the settlement system for corporate and other bonds. Delivery versus payment (DVP) has been available for JGBs, corporate and other bonds, and exchange-traded stocks.

In recent years, reform of the securities settlement systems has been proceeding and significant and wide-ranging progress has been made. In terms of the legal framework, a new law was enacted in 2002 enabling the dematerialisation of JGBs, corporate and other bonds, and commercial paper (CP) from 2003. JGBs and CP are scheduled to be settled through new book-entry systems that will operate under the new law from 2003. DVP will also be achieved for CP in the new book-entry system. A unified central counterparty (CCP) for exchange-traded stocks will start operation in 2003, and the introduction of a DVP mechanism for stocks traded outside the exchanges in 2004 has been agreed among the relevant parties. In addition, the use of trade or pre-settlement confirmation systems is expected to become available for broader types of securities.

In retail payments, the predominance of cash for small-value payments and the almost complete absence of cheque use by individuals are the prominent features that distinguish payment practices in Japan. Electronic funds transfers, including services such as prearranged direct debits for the payment of utility bills and direct credits for the payment of payrolls, are widely used by both firms and individuals. Credit cards are commonly used while the use of electronic money and debit cards is very limited. Postal accounts and postal giro services provided by the government-run Post Office are also popular.

With regard to access channels for various retail payment services, new channels such as the internet and mobile phones, as well as existing channels such as bank windows and automated teller machines (ATMs), are used. Convenience stores have also become popular locations for paying utility bills.

1. Institutional aspects

1.1 General institutional framework

1.1.1 *Legal and regulatory framework*

There is no uniform or comprehensive law in Japan that governs payment and securities settlement. Rather, a number of laws combine to form the legal basis for payment and securities settlement.

With regard to the regulatory authorities, most of the relevant laws governing a variety of financial sector matters specify the Prime Minister as the minister in charge. These include regulation and supervision in the areas of payment and securities settlement. In practice, the Prime Minister delegates authority to the Commissioner of the Financial Services Agency (FSA) based on the provisions of the relevant laws. In addition, the Minister of Finance is in charge of matters related to

JGBs. The Minister of Justice is also responsible for the legal rules governing the book-entry transfer of securities, because these rules constitute a part of civil and commercial law.

The Bank of Japan Law stipulates that, in addition to regular business prescribed by Article 33, such as deposit taking and funds transfers (the basic business component of the BOJ-NET Funds Transfer System), the Bank may, upon receiving authorisation from the Prime Minister and the Minister of Finance, conduct business (carried out in conjunction with its prescribed regular business) that contributes to the smooth settlement of funds. This includes operation of the FXYCS and the JGB Book-entry System. In addition, the Bank oversees the payment and settlement systems in the private sector to achieve its objective, as stipulated in Article 1 of the Bank of Japan Law, namely “to ensure smooth settlement of funds among banks and other financial institutions, thereby contributing to the maintenance of an orderly financial system”.

While operators of the private sector clearing systems for interbank payments (ie bankers' associations) are subject to supervision as public interest incorporated associations under the Civil Code, institutions related to securities settlement such as CCPs, CSDs and stock exchanges are regulated and supervised by the relevant ministers such as the Prime Minister.²

1.1.2 Legal basis for payment

There is no law that specifically governs electronic funds transfers or paper-based payments in Japan. Rights and obligations regarding individual payments are governed by individual contractual relationships and general private laws such as the Civil Code and the Commercial Code.

Regarding means of payment, banknotes issued by the Bank of Japan and coins issued by the government receive the status of legal tender under the Bank of Japan Law and the Unit of Currency and Issuance of Coins Law respectively. Paper-based means of payment such as bills and cheques, which utilise deposits for payment, are governed by the Bill Law and the Cheque Law. In addition, prepaid cards, whose features are relatively close to those of electronic money, are governed by the Prepaid Card Law.

With respect to deposits, the Capital Subscription Law stipulates that, in order to take deposits, an institution must be authorised to do so under other laws. Specifically, only certain categories of institution are allowed to take deposits and conduct funds transfers: for example, banks are allowed to do so under the Banking Law, while other types of financial institution do so under the respective laws governing them in this regard (eg *shinkin* banks under the Shinkin Bank Law).

Postal savings, postal giro and postal money orders are governed by the Postal Savings Law, the Postal Giro Law and the Postal Money Order Law respectively.

1.1.3 Legal basis for securities settlement

The current laws regarding JGBs, stocks and corporate and other bonds support the immobilisation and/or dematerialisation of securities and book-entry transfers, while the applicable laws differ according to the type of security. Effective from January 2003, the Law Concerning Book-Entry Transfer of Corporate and Other Debt Securities (hereafter the Transfer of Corporate Debt Securities Law) will enable dematerialisation and establishment of multi-tiered book-entry systems for various types of debt securities including JGBs, corporate bonds and CP.

Under these laws as well as general private laws such as the Civil Code and the Commercial Code, legal title and interests in securities are transferred or perfected via: (1) delivery of certificates for physical securities; (2) change of the securities holders' names on the books of registrars for registered securities; or (3) credits and debits to accounts on the books of the CSD and participants for book-entry securities.

² The legal framework for regulation and supervision of CCPs for securities trades and CSDs for debt securities will be introduced in January 2003 pursuant to the relevant laws.

1.1.4 Enforceability of netting arrangements

Payment netting is a legally accepted means for counterparties to agree to fulfil their obligations. Novation netting is also considered effective and enforceable in the case of a counterparty's default.

The Law Concerning Closeout Netting of Specified Financial Transactions Entered into by Financial Institutions ensures that closeout netting of specified types of financial transactions (derivatives transactions, cash-collateralised securities lending and repurchase agreements) between two counterparties is enforceable under insolvency proceedings.

1.2 The role of the central bank

The Bank of Japan, Japan's central bank, was founded in 1882. Article 1 of the Bank of Japan Law stipulates that the Bank's objectives are to issue banknotes, to carry out currency and monetary control and to ensure the smooth settlement of funds among banks and other financial institutions, thereby contributing to the maintenance of an orderly financial system. To achieve these objectives, the Bank of Japan provides various payment and settlement services such as the provision of means of payment (ie banknotes and deposits in current accounts held with the Bank) and the operation of the BOJ-NET as the central bank's online payment and JGB settlement systems. The Bank of Japan also oversees the payment and settlement systems in the private sector. The responsibilities of the Bank of Japan in the field of payments and settlements are explained in the subsections below.

1.2.1 Issuance of banknotes

The Bank of Japan is the sole issuer of banknotes in Japan and banknotes are given the status of legal tender under the Bank of Japan Law. In other words, they must be accepted by any creditor in satisfaction of any debt except when otherwise agreed by both the debtor and the creditor.

Banknotes issued by the Bank of Japan incorporate various anti-counterfeiting features. In recent years, however, counterfeiting has increased sharply in major countries including Japan, and the Bank actively exchanges information and conducts joint studies with other central banks. In order to improve security against counterfeiting, it was decided in August 2002 to introduce a new series of the Bank of Japan notes (10,000 yen, 5,000 yen and 1,000 yen notes³) in the first half of fiscal year 2004.

1.2.2 Provision of payment and settlement services

1.2.2.1 Payment through current accounts

Financial institutions' deposits in current accounts at the Bank of Japan are used for a number of purposes including serving as settlement assets for interbank obligations. At the end of 2001, 667 institutions, including banks, securities companies and bankers' associations as operators of private payment systems, held current accounts with the central bank. The Bank of Japan has been operating an online payment system, the BOJ-NET Funds Transfer System, since 1988 to process funds transfers between financial institutions through the central bank accounts (see Section 3.5).

The Bank of Japan provides current account services to financial institutions that meet certain criteria, which were made public in 1998. These criteria specify that, to open a current account with the Bank, applicants need to be in sound financial condition in terms of capital adequacy, have appropriate operational capability, and must enter into a contract with the Bank, under which they agree to undergo on-site examinations conducted by the Bank, based on Article 44 of the Bank of Japan Law. In addition, for securities companies, sufficient standing in securities markets is required.

The Bank of Japan has been providing intraday overdrafts to facilitate the smooth settlement of funds through the central bank accounts on an RTGS basis since the beginning of 2001 under Article 33 of the Bank of Japan Law. Separately, the Bank of Japan may extend loans to financial institutions

³ The 2,000 yen note, first issued in July 2000, has already incorporated more advanced anti-counterfeiting features than the current 10,000 yen, 5,000 yen and 1,000 yen notes.

experiencing liquidity constraints, in its role as the lender of last resort, under Articles 33, 37 and 38 of the Bank of Japan Law.

1.2.2.2 Settlement of JGB transactions

The Bank of Japan has been providing services for registration of JGBs since 1906, as the sole registrar under the Law Concerning Government Bonds. In 1980, the Bank of Japan established the JGB Book-entry System, in which the Bank serves as the depository, to promote the sound development of the JGB secondary market. In 1990, the Bank of Japan introduced an online system, the BOJ-NET JGB Services, to process transfer registrations and book-entry transfers of JGBs (see Section 4.2).

The Bank of Japan made public the Requirements for Admission as a Participant in the JGB Book-entry System in 2001 with a view to further enhancing the transparency of the administration of the JGB Book-entry System. These requirements specify that, to be participants in the system, applicants need to be in sound financial condition in terms of capital adequacy and have appropriate operational capability.

1.2.3 Oversight

Major private clearing systems play an important role in Japan's overall payment system. For instance, while the daily average of transactions settled in the BOJ-NET Funds Transfer System was JPY 77 trillion (USD 634 billion) in 2001, the value of transactions handled by the FXYCS and the Zengin System averaged JPY 28 trillion (USD 230 billion) and JPY 10 trillion (USD 82 billion) respectively.

In view of the systemic importance of the major clearing systems, the Bank of Japan recognises that activities which it conducts in its capacity as overseer of the nation's payment and settlement systems are essential for promoting their safety and efficiency. The Bank also oversees securities settlement systems as a whole, paying particular attention to their funds clearing aspects, not only because of the close relationship between these and payment systems but also because of their size in both volume and value terms. These securities settlement systems include CCPs, CSDs and other related arrangements for securities settlement.

To ensure the safety and efficiency of Japan's payment and settlement systems, the Bank of Japan collects and analyses relevant information including statistical data, reviews and assesses the design and operation of each system, and encourages improvements in payment and settlement systems. The Bank of Japan, where necessary and appropriate, makes changes to the BOJ-NET to facilitate improvements in these systems.

The Bank of Japan currently oversees the payment and settlement systems in the private sector, based on the international standards set forth in the Core Principles for Systemically Important Payment Systems by the Committee on Payment and Settlement Systems (CPSS) of the central banks of the Group of Ten countries, and in the Recommendations for Securities Settlement Systems by the CPSS and the Technical Committee of the International Organization of Securities Commissions (IOSCO), both of which were made public in 2001. In addition, the Bank participates in central banks' cooperative oversight activities where relevant for the safe and efficient settlement of the currency it issues.

In recent years, for example, as part of its oversight activities the Bank of Japan encouraged the FXYCS and the Zengin System to introduce the necessary risk reduction measures on the basis of the Lamfalussy Standards⁴ (see Section 3). The Bank also encouraged the introduction of a DVP mechanism for transactions involving corporate and other bonds as well as exchange-traded stocks, based on the Group of Thirty's 1989 standards⁵ (see Section 4).

The major policies and role of the Bank of Japan with respect to oversight are explained in "The role of the Bank of Japan in payment and settlement systems", published in 2002.

⁴ *Report of the Committee on Interbank Netting Schemes of the central banks of the Group of Ten countries*, BIS, 1990.

⁵ *Clearance and settlement systems in the world's securities markets*, Group of Thirty, 1989.

1.2.4 Examination and monitoring

The Bank of Japan conducts on-site examinations and off-site monitoring of the financial institutions that hold current accounts with it. In on-site examinations, in addition to analysing various issues such as asset quality and profitability of financial institutions, the Bank evaluates the reliability and security of computer systems and the management of settlement risks arising from participation in payment and settlement systems or from provision of settlement services to other financial institutions. Also, a number of issues associated with settlement activities, including financial institutions' management of their daily liquidity and the total value of securities eligible as collateral for the Bank's credit extension, are covered in off-site monitoring. These monitoring functions also contribute to the Bank's performance of a number of its other duties including the conduct of monetary policy as well as ensuring the smooth functioning of the overall payment and settlement system.

1.2.5 Treasury funds operations

On behalf of the central government, as well as handling JGB-related services such as issuance and payment of principal and interest, the Bank of Japan receives and disburses treasury funds pursuant to the Bank of Japan Law and the Public Accounting Law. For example, the Bank receives payments of national taxes and social security premiums from the general public, either indirectly via financial institutions acting as its agents⁶ or directly at its offices, and the collected funds are deposited in the government account. Treasury funds, including payments for public works projects and pensions, are also disbursed to the general public by the Bank in a similar manner.

The Bank of Japan provides accounting services for government deposits held with the Bank. The Bank also sorts and calculates receipts and disbursements of treasury funds for government agencies and specific government accounts.

1.3 The role of other private and public sector bodies

1.3.1 Providers of payment services

1.3.1.1 Banks

As well as offering a variety of payment services, banks, together with bankers' associations, cooperate in establishing and managing interbank clearing systems such as BCCSs, the Zengin System and the FXYCS. Also, to meet strong public demand for cash from depositors, banks provide a nationwide network of automated teller machines (ATMs). In addition, banks provide direct debit and direct credit services, and issue debit cards.

There were seven city banks, 64 regional banks, 56 member banks of the Second Association of Regional Banks, 73 branches of foreign banks in Japan, two long-term credit banks, 29 trust banks, 621 financial institutions serving mainly small businesses⁷ and individuals, and 1,697 financial institutions serving mainly the agriculture and fisheries sector⁸ in Japan as of April 2002.

1.3.1.2 New types of banks

As use of the internet and mobile phones has become widespread and customer needs diversified, new types of banks have emerged, such as internet-only banks and also a bank that specialises in ATM services. Non-financial entities are one of the major drivers of these new banks.

⁶ With the approval of the government, the Bank of Japan makes agency contracts with financial institutions, allowing designated branches of these institutions to act as its agents for the collection and disbursement of government funds.

⁷ Financial institutions that focus on lending to small businesses, including Shinkin Central Bank, *shinkin* banks, Shoko Chukin Bank, Shinkumi Federation Bank, credit cooperatives, National Federation of Labour Credit Associations and labour credit associations.

⁸ Financial institutions that concentrate on lending for agriculture and fisheries, including Norinchukin Bank, agricultural cooperatives and fishery cooperatives.

The Financial Reconstruction Commission and the FSA responded to the establishment of these new types of banks by formulating Measures for Licensing and Supervision of New Types of Banks including Entry into Banking Business by Non-Financial Entities (Operational Guidelines) in August 2000. Also, the Banking Law was amended in November 2001 so as to govern the entry of non-financial entities into the banking business by regulating the major shareholders of the banks.

1.3.1.3 *Non-banks*

In certain respects, non-banks such as securities companies, insurance companies, credit card companies, consumer credit companies and retailers compete with banks in providing payment services. For example, non-banks have installed ATMs and issue various cards. Retailers, public transportation companies and telephone companies issue prepaid cards, and consumer credit companies and retailer affiliates issue credit cards.

At the same time, non-banks also cooperate with banks. For instance, securities companies provide a service whereby once the balance of a customer's demand deposit account at a bank reaches a preset level, any additional inflow of funds to the account will automatically be transferred to the customer's mutual fund investment account at a securities company. If the balance of the demand deposit account falls below the preset level, the shortage will automatically be made up by transferring sales proceeds from the customer's mutual fund investment account.

1.3.1.4 *Japanese Bankers Association*

The Japanese Bankers Association consists of banks and regional bankers' associations. At the end of 2001, there were 141 full member banks, 46 associate member banks and 72 special members (bankers' associations).⁹

One of the roles of the Japanese Bankers Association is to enhance the safety and efficiency of the industry's payment procedures by establishing market practices and standards. Examples of these market practices and standards are as follows: (1) Market Practices for Real-Time Gross Settlement for money markets, including payment practices for those market transactions; (2) "model contracts" for customer accounts, remittances and letters of credit; (3) standard operating procedures for direct debit, domestic funds transfers, government funds and custody operations; (4) certificate formats for bills, cheques, bonds and other securities; (5) formats for magnetic tapes, floppy disks and smartcards (Zenginkyo IC Cash Card Specification); and (6) online data exchange protocols (Zenginkyo data transmission protocol).

1.3.1.5 *Tokyo Bankers Association*

The Tokyo Bankers Association (TBA) is the largest of Japan's 72 regional bankers' associations. The TBA is an incorporated association and has full-time employees, while the Japanese Bankers Association is an unincorporated association for which the TBA functions as the secretariat.

The TBA operates clearing systems such as the Tokyo Clearing House, the Zengin System and the FXYCS. The TBA is the secretariat for interbank ATM network systems such as the Banks Cash Service (BANCS) and the Multi Integrated Cash Service (MICS). Also, the TBA chairs the Society for Worldwide Interbank Financial Telecommunication (SWIFT) user group in Japan.

1.3.1.6 *Other regional bankers' associations*

The core business of the other 71 regional bankers' associations is to conduct bill and cheque clearing among their member banks.

1.3.1.7 *Post Office*

The Japanese government started providing postal services as governmental non-profit services in 1871. After the reform of central government ministries and agencies in January 2001, the Postal

⁹ Membership dues for associate members are lower than those for full members, and there are some restrictions on voting rights of associate members.

Services Agency was established as an external agency of the Ministry of Public Management, Home Affairs, Post and Telecommunications for the purpose of providing these postal services.

Besides financial services such as postal savings, postal insurance and pensions, the Post Office provides payment services that utilise its transferable deposit accounts, with a nationwide network of approximately 24,000 post offices (banks had approximately 14,000 branches at the end of March 2002).

At the end of 2001, the outstanding amount of postal savings totalled JPY 240 trillion (USD 1.8 trillion), while the outstanding amount of bank deposits totalled JPY 589 trillion (USD 4.5 trillion).¹⁰

The Postal Services Agency is scheduled to transfer its business to the Japan Post, a newly established government-owned public corporation, in April 2003.

1.3.2 Providers of securities settlement services

1.3.2.1 Securities companies

Securities companies provide various kinds of securities-related services such as dealing, brokerage, underwriting and public offering and distribution of securities in both primary and secondary markets. In order to engage in securities business, securities companies must be registered with the Prime Minister. At the end of 2001, there were 291 securities companies including 50 foreign securities companies in Japan.

1.3.2.2 Banks

According to the provisions of the relevant laws, such as the Banking Law, banks are permitted to engage in certain securities-related services. These include securities lending services, custody services and the underwriting and selling of government and other public debt securities. In addition, a number of banks function as designated registrars under the Law on Registration of Corporate and Other Bonds. Registrars also function as pre-settlement service institutions providing the necessary services for corporate and other bonds in advance of settlement, such as examining the content of the instructions, assigning bond serial numbers if necessary, rearranging the order of settlement instructions and checking the balances of sellers' accounts.

1.3.2.3 Japan Bond Settlement Network

The Japan Bond Settlement Network Co Ltd (JB Net) operates an online network system which links participants (investors and dealers), registrars and the Bank of Japan for funds transfers, thereby facilitating the smooth transfer of corporate and other registered bonds, including corporate bonds, government-guaranteed bonds and municipal bonds. JB Net functions as the intermediary in this online network system. JB Net was established by financial institutions including banks, securities companies, investment companies and insurance companies in 1996, and started operation in 1997. There were 453 direct participants, 424 indirect participants and 37 pre-settlement service institutions at the end of 2001.

1.3.2.4 Japan Securities Depository Centre

The Japan Securities Depository Centre (JASDEC) was established as the CSD for stocks and started operation in 1991, under the Law Concerning Central Depository and Book-Entry Delivery for Share Certificates and Other Securities. Based on the amendment of the law in 2001, JASDEC changed from an incorporated foundation into a joint stock corporation in June 2002. At the end of 2001, JASDEC had 294 participating institutions, including securities companies, banks, stock exchanges and the TBA, and 3,594 Japanese companies entrusted JASDEC with the handling of their stocks.

¹⁰ Deposits held with domestically licensed banks and *shinkin* banks.

1.3.2.5 *Stock exchanges*

There are five stock exchanges in Japan: the Tokyo Stock Exchange, Osaka Securities Exchange, Nagoya Stock Exchange, Fukuoka Stock Exchange and Sapporo Securities Exchange.

The Tokyo Stock Exchange and the Osaka Securities Exchange were originally founded in 1878 and re-established in 1949. Following an amendment of the Securities and Exchange Law that allowed stock exchanges to transform their corporate structure, the Osaka Securities Exchange and the Tokyo Stock Exchange changed from a membership organisation to a joint stock corporation in April and November 2001 respectively, with a view to improving their international competitiveness. The Nagoya Stock Exchange also became a joint stock corporation in April 2002.

The Tokyo Stock Exchange and the Osaka Securities Exchange predominate in terms of both volume and value traded. The Tokyo Stock Exchange dominates listed stock and convertible bond trades, and the Osaka Securities Exchange lists Nikkei Average Futures, the most actively traded stock index futures in Japan.

1.3.2.6 *Japan Securities Dealers Association*

The Japan Securities Dealers Association (JSDA), formed under the Securities and Exchange Law, aims to ensure that purchases and sales of securities take place fairly and smoothly, thus contributing to the protection of investors. It established an OTC market for securities and serves as a self-regulatory organisation. In addition, the JSDA took the lead in establishing the Japan OTC Securities Co, Ltd - the present JASDAQ Market, Inc - to facilitate OTC securities trading. The JSDA also coordinates OTC market practices, including settlement practices. For example, the JSDA has laid out Guidelines for Real-Time Gross Settlement of Government Securities Transactions. Furthermore, the JSDA functions as the industry association for securities dealers. There were 291 securities company members and 233 special members (registered financial institutions, consisting of banks, insurance companies, money market brokers and securities finance companies) at the end of 2001.

1.3.2.7 *JASDAQ market*

The JASDAQ market is an OTC stock market managed by the JSDA. Shares of stocks registered with the JSDA that meet certain standards are traded in the JASDAQ market under JSDA regulations. In the JASDAQ market, stocks are traded over the JASDAQ system, which is a trading network system connecting securities companies, information vendors, the JSDA and JASDAQ Market, Inc, to which the JSDA has consigned relevant operations. JASDAQ Market, Inc has been functioning as the CCP for the JASDAQ market since 2001.

1.3.2.8 *Proprietary trading systems*

In 1998, it became possible to conduct trading of listed securities outside the exchanges following an amendment to the Securities and Exchange Law whereby dealers were no longer required to funnel orders to the exchanges. At the same time, the operation of a proprietary trading system (PTS) - an electronic system whose functions are similar to those of the exchanges - was recognised as a form of securities business requiring approval from the Prime Minister. Based on this amendment to the law, securities companies started providing electronic trading services for JGB transactions in June 2000. At the beginning, only a limited number of PTSs were approved. With the revision of PTS approval standards, which came into effect in December 2000, some more PTSs were approved.

1.3.3 Other service providers

1.3.3.1 Tokyo International Financial Futures Exchange

The Tokyo International Financial Futures Exchange (TIFFE) was established in 1989 as a non-profit, membership-based organisation under the Financial Futures Trading Law, mainly to provide trading instruments for short-term interest rate futures.¹¹

Banks, securities companies, insurance companies, branches of foreign banks and foreign securities companies in Japan, as well as other financial institutions participate in TIFFE. There were 70 clearing members and 29 general (non-clearing) members as of December 2001. The former settle transactions on behalf of the latter, using the designated settlement banks for payment.

TIFFE provides in-house clearing services, in which it functions as the CCP for futures transactions. Members' positions are marked to market every day, and the variation margin is settled on the following day.

Procedural steps for the settlement of funds are as follows: (1) TIFFE calculates each clearing member's variation margin and notifies each of their designated settlement banks of the necessary information for the settlement of funds; (2) each settlement bank transfers funds from the accounts of clearing members with net debit positions to TIFFE's account (with the settlement bank), and then transfers funds from TIFFE's account to those of clearing members with net credit positions; and (3) when funds transfers between settlement banks are necessary, they are processed through the BOJ-NET Funds Transfer System on an RTGS basis at 12:00, transferring funds from the accounts of settlement banks in surplus to the account of TIFFE, and then from the account of TIFFE to the accounts of the settlement banks with shortages.

TIFFE requires its clearing members to make loss compensation deposits in addition to margin and membership deposits. If a non-clearing member fails to meet an obligation, the clearing member needs to settle the transaction on its behalf; if a clearing member fails to meet an obligation, TIFFE provides liquidity to its account held with a settlement bank or with the Bank of Japan in order to complete the settlement. TIFFE is compensated for the loss it incurs by the following: (1) the failed clearing member's margin and deposits with TIFFE; (2) TIFFE's reserves for default compensation; and (3) loss compensation deposits made by the survivor clearing members. For any loss in excess of these funds, the survivor clearing members are required to make additional loss compensation deposits.

2. Payment media used by non-banks

2.1 General overview

This section describes means of payment, instruction instruments and access channels that are used for making retail payments in Japan. While bank deposits are the most widely used means of payment, cash is also very frequently used, particularly for small-value payments. In addition, postal deposits are commonly used for payments. Electronic money is not much in use in practice, but prepaid cards, which have a function similar to electronic money, are very common.

Turning to instruction instruments, the use of non-paper instruments such as direct debits, credit transfers, credit cards and debit cards, which enable account holders to instruct institutions to make payments out of their deposit accounts, has generally been increasing. On the other hand, the use of bills and cheques has been declining.

¹¹ The following products are currently listed on TIFFE: three-month euroyen futures, three-month euroyen Libor futures, US dollar-Japanese yen currency futures, options on three-month euroyen futures, calendar spreads on three-month euroyen futures and Libor-Tibor spreads. Among these, three-month euroyen futures are most actively traded.

Diversification of access channels has been remarkable in the past few years. In addition to ATM services and firm banking, services provided through new access channels, such as internet banking, mobile banking and convenience store banking, are making steady advances.

2.2 Cash and deposits

2.2.1 Cash

The Bank of Japan has the exclusive authority and responsibility to issue and circulate banknotes. Article 46 of the Bank of Japan Law stipulates that banknotes shall be used as legal tender for payments and that there is no limit to the acceptability of banknotes for payments. Four denominations of banknotes are currently issued under the Bank of Japan Law Enforcement Order: 1,000 yen, 2,000 yen, 5,000 yen and 10,000 yen.¹²

Coins are issued by the Japanese government and put into circulation by the Bank of Japan under the Unit of Currency and Issuance of Coins Law. Article 7 of the Law stipulates that coins must be accepted as legal tender for payment of amounts up to 20 times the face value of the given denomination of coin.¹³ Coins come in six denominations - 1 yen, 5 yen, 10 yen, 50 yen, 100 yen and 500 yen - in addition to coins that are specially issued on commemorative occasions.

Cash is used extensively in Japan compared with other industrial countries. The ratio of cash in circulation to nominal GDP, 14.4% at the end of 2001, was the highest among G10 countries. At the end of 2001, banknotes in circulation totalled JPY 69 trillion (USD 525 billion) and coins JPY 4.3 trillion (USD 33 billion). There are three reasons for the high preference for cash in Japan: (1) obtaining cash is not expensive due to highly developed nationwide ATM networks; (2) there is little risk in carrying cash because Japan is a comparatively safe country where crime rates are low; and (3) the public continues to have a high level of confidence in cash as a means of payment because anti-counterfeiting measures have been effective.

2.2.2 Bank deposits

The outstanding amount of demand deposits was JPY 276 trillion (USD 2.1 trillion) and the number of bank accounts for demand deposits stood at 419 million at the end of March 2002.¹⁴

Deposits in bank accounts are used as a means of payment for instruction instruments such as direct debits, credit transfers, credit cards, debit cards and bills and cheques. Payments made using these instruments have been increasing, partly reflecting the development of a variety of access channels such as ATMs, the internet, mobile phones and convenience stores.

2.2.3 Postal savings

Postal deposits are also used for making retail payments. The outstanding amount of ordinary and transferable postal deposits was JPY 50 trillion (USD 377 billion) and the number of these postal deposit accounts 117 million at the end of March 2002. Payment services using postal accounts include funds transfers,¹⁵ prearranged direct credits, direct debits, debit cards and ATM services.

¹² In addition to these, there are six denominations of banknotes which are valid though they are not currently issued: 1 yen (USD 0.008), 5 yen, 10 yen, 50 yen, 100 yen and 500 yen.

¹³ According to the directives of the Ministry of Finance, there is no limit to the acceptability of coins for payments made to the government, such as taxes.

¹⁴ Demand deposits held with domestically licensed banks and *shinkin* banks.

¹⁵ The number of financial institutions that provide funds transfer services between their accounts and postal accounts was 33 at the end of 2001.

2.3 Electronic money

Various card-based and network-based e-money pilot projects such as Visa Cash have been conducted since 1997, all of which have been confined to specific geographical areas.

Some card-based products have been put into commercial use, although the volume and value of electronic money transactions are negligible compared to those of other means of payment. Mondex launched its service to certain firms in August 2000, combining an employee ID function with e-money that can be used within the office building. E-money called Edy has been available on contactless smartcards since November 2001, and can be used within virtual malls on the internet, a limited number of office buildings, shopping malls and convenience stores.

2.4 Prepaid cards

Prepaid cards are cards that store data regarding the amount paid for the cards and the amount spent so far. They are used for specific services provided by the issuer, and the remaining balance is usually displayed on the card reader during use. The Prepaid Card Law, enacted in 1989, obliges card issuers to deposit funds equivalent to half of the unused value of issued cards with the legal affairs bureaus of the Ministry of Justice in order to protect cardholders, who are the issuers' creditors.

Prepaid cards have spread rapidly in Japan since the 1980s as a means of payment for public telephones and public transportation such as railways, underground railways and buses. Originally, each company issued cards that could be used only for their own services; however, there are some recent examples of a number of service providers sharing the same prepaid card scheme. For example, in October 2000, a number of railway and underground railway companies issued a joint transportation card, which allows passengers to travel on various railway lines using a single card. Telephone cards issued by Nippon Telegraph and Telephone Corporation were very common in the 1980s and early 1990s, but the number is declining due to the increasing popularity of mobile phones.

Most prepaid cards are magnetic cards, but smartcards have also appeared recently. In November 2001, a railway company introduced a contactless and reloadable smartcard for the payment of train fares. This card facilitates the entrance process because passengers are able to pass through ticket gates by simply touching the card reader with the card.

2.5 Direct debits

Prearranged direct debits are intrabank funds transfer arrangements used widely for making a broad range of recurring payments. They were first introduced in 1955 for the payment of telephone bills. They have expanded rapidly since the early 1960s and are now used extensively for the payment of public utility bills, credit card bills, taxes, school tuition, insurance premiums and loan repayments.

Direct debit services are provided on the basis of a tri-party agreement between the payer, the payee and their bank. The payee sends payment instructions to the bank on a paper basis, on magnetic tape or through online transmission. On a designated day, the bank debits the amount instructed from the payer's ordinary deposit account¹⁶ and credits the payee's account.

2.6 Credit transfers

Credit transfers are popular for remitting funds to a payee in a remote location, or for sending large amounts of funds where physical delivery of cash would entail risks. Most credit transfers use electronic funds transfer systems for making intrabank or interbank payments. Interbank credit transfers are processed through private clearing systems such as the Zengin System and sometimes directly through the BOJ-NET Funds Transfer System (see Sections 3.3 and 3.5).

Prearranged direct credits used for the payment of salaries and pensions are an example of such credit transfer services. They are based on a tri-party agreement among the payer, the payee and the

¹⁶ An ordinary deposit is a type of demand deposit against which cheques cannot be drawn. It is estimated that most households in Japan have at least one ordinary deposit account.

payee's bank. In the case of salaries, the firm using the service sends payroll data to its bank, and the bank transfers funds according to the data on the designated day.

2.7 Credit cards

Since the issuance of the first card in 1960, credit cards have become increasingly popular in Japan. The number of credit cards and the value of payments made using credit cards have almost doubled over the past 10 years. There were 232 million cards at the end of March 2001, and the value of payments made by credit cards amounted to JPY 23.3 trillion (USD 192 billion) in 2001. Major issuers of credit cards include bank affiliates,¹⁷ consumer credit companies and retailer affiliates.

In most cases, the Credit and Finance Information System (CAFIS), a system established in 1983 primarily by bank-affiliated credit card companies, carries out the necessary data processing. When a customer presents a credit card to a member merchant, the information on the magnetic stripe is read by a credit authorisation terminal (CAT) and sent to the computer of the credit card company via the CAFIS Centre. The computer checks for lost or stolen cards, verifies credit limits and automatically processes the purchase.

The use of credit cards over the internet for online shopping has started to increase with the development of business-to-consumer electronic commerce, although the volume and value are still very low. Many credit card companies are starting to issue cards that have a wider variety of applications such as financing, cash dispensing and revolving credit facilities.¹⁸ Bank-affiliated issuers are also planning to replace traditional magnetic stripe credit cards with smartcards from 2003, for the purpose of preventing credit card skimming.

2.8 Debit cards

In 1984, Japanese banks began offering the same type of service as today's debit card service under the name "Bank POS". It was not really successful, however, because the service was not very practical for users: debit card users had to apply to the financial institution before using their cash cards as debit cards, and it took 30 to 50 seconds to process a single payment.

Advances in telecommunications technology in the 1990s and deregulation in July 1997 laid the groundwork for the development of today's debit card service. The Japan Debit Card Promotion Council started providing a debit card service called "J-Debit" in January 1999, which expanded nationwide in March 2000. Although its use is still limited compared to other instruments, the value of debit card transactions more than doubled from 2000 to JPY 305 billion (USD 2.5 billion) in 2001. At the beginning of October 2001, there were 1,765 financial institutions participating in J-Debit, and 1,173 merchants participating as direct participants. There were also 344 million cash cards that could be used as debit cards. As of January 2002, more than 180,000 terminals had been installed.

When a customer purchases goods or services using a debit card, the customer inserts the card into a CAT terminal and enters his/her personal identification number (PIN) from a keypad attached to the terminal. The transaction data are sent from the terminal to the customer's bank via the CAFIS Centre. Upon receiving the data, the bank debits the customer's account. The CAFIS Centre then sends the transaction data to the clearing centre, where net positions between banks are calculated on the day following the transaction. Interbank net positions are cleared again with other interbank payments through the Zengin System or through other smaller clearing systems operating within groups of financial institutions of the same type, two days after the transaction. The member merchant's account is credited three days after the transaction or later.

¹⁷ Until 1983, banks were not allowed to issue credit cards themselves.

¹⁸ Revolving credit facilities enable cardholders to make instalment payments.

2.9 Bills and cheques

Bills are used for payments in the business sector and can be discounted by banks. Cheques are widely used by government agencies and firms, but used only rarely for the payment of salaries or by individuals, eg for the payment of credit card bills and public utility bills. Both bills and cheques are collected and exchanged between banks at regional bill and cheque clearing houses (see Section 3.2). Recently, the volume of transactions using these paper-based instruments has been declining. The ratio of the value of bills and cheques cleared to nominal GDP declined from 8.6 times in 1991 to 1.7 times in 2001. This is because credit transfers have been used for payments by firms more widely than bills, for reasons such as the stamp tax on bills.

2.10 ATMs

Automated teller machines (ATMs) were first introduced by several city banks in 1969, and spread rapidly as many banks adopted online computer systems in the 1970s. ATMs were initially installed in bank lobbies, but began to appear at other easily accessible locations in 1973. ATMs provided cash withdrawal services only at the initial stage, but began to provide cash deposit services as well from 1977. Today they accept both banknotes and coins and process credit transfers and loans. Throughout the past couple of decades banks have installed increasing numbers of ATMs, with 116,905 machines deployed by the end of March 2002.

Since 1980, banks have linked their in-house ATM systems with other banks' systems to enable customers to withdraw banknotes from the ATMs of peer banks. To date, nine major online networks exist, each operated within a group of financial institutions of the same type.¹⁹ The Multi Integrated Cash Service (MICS), established in 1990, serves as the relay centre for the nine networks, and provides nationwide ATM data transmission and clearing services. MICS had 1,916 financial institutions as members at the end of March 2002, linking virtually every financial institution in the private sector. The interbank credit and debit positions resulting from the use of these ATM networks are calculated at the end of each business day. Interbank net positions are cleared again together with other interbank payments through the Zengin System or the groups' own clearing systems, and then settled through the accounts held with the Bank of Japan or with the groups' central organisations.

Several banks plan to strengthen the security and increase the efficiency of their services by replacing traditional magnetic stripe cash cards with smartcards. Using a single multifunctional smartcard, customers will be able to access various types of services such as cash card, debit card, credit card and e-money services.

The Post Office and non-banks such as life insurance companies and securities companies also have their own ATMs. The number of ATMs installed by the Post Office totalled 25,802 at the end of March 2002.²⁰ Securities companies had installed 529 ATMs by the end of June 2002, and 10 major life insurance companies 640 ATMs by December 2001.

2.11 Firm banking

Firm banking (FB) is an online banking service for corporate customers available at their premises. Firms are able to obtain information, including their account balances and transaction records, and initiate credit transfers and direct debits by accessing their banks via telephone, facsimile, FB terminal or personal computer. With the widespread use of the internet, the use of personal computers as an access channel and the types of services offered through the internet have been increasing.

Firms using FB services are usually linked to their banks via the Automatic answer Network System for Electrical Request (ANSER) network or shared Cash Management Service (CMS) centres. ANSER is a data transfer system, provided by NTT Data Corporation since 1981, which links banks with firms.

¹⁹ City banks, regional banks, member banks of the Second Association of Regional Banks, trust banks, long-term credit banks and the Shoko Chukin Bank, *shinkin* banks, credit cooperatives, labour credit associations and agricultural cooperatives.

²⁰ The number of financial institutions that have connected their ATMs with the ATMs of the Post Office has been increasing rapidly since such connections were first established in 1999, and reached 2,084 in January 2002.

The shared CMS centres, the first of which began operation in 1987, connect firms with multiple banks in a single session. Shared CMS centres offer services such as multibank reporting (which enables firms to check their account balances at more than one bank simultaneously) and batch file transfer (which enables firms to send payment instructions including those related to payroll and direct debit to multiple banks at one time).

2.12 Home banking

Home banking allows individuals to access banking services online from home. It began with a telephone enquiry service and a pay-by-phone service in the early 1980s. An experiment for placing funds transfer orders by telephone using Nippon Telegraph and Telephone Corporation's Character and Pattern Telephone Access Information Network (CAPTAIN) system started in 1984. From that time until about 1997, various home banking services were offered using terminals such as TV game machines and touch-screen phones. Today, customers are able to access services including credit transfers and account balance enquiries by telephone, personal computer, mobile phone and digital TV.

Although the use of home banking was limited until around 1997, it has expanded rapidly since 1997 with the prevalence of personal computers and easy access to the internet.

2.12.1 Internet banking

Banks started providing internet-based banking services including credit transfers and account balance enquiries in 1997. The first internet-only bank, whose sole access channel is the internet (it has no physical branches) and which targets small business and individuals, appeared in 2000.

2.12.2 Mobile banking

Mobile banking is a type of internet banking using mobile phones as terminals. This became possible from 1999 as many mobile phones became equipped with text-based web interfaces. At the end of March 2002, and with the assistance of telecommunications companies, 334 financial institutions offered this type of service.

2.12.3 TV banking

With the launch of broadcasting satellite digital TV services in December 2000, several banks have started providing banking services via BS digital TVs. In one of the schemes, customers are able to view account and transaction information on their digital TV screens. They use remote control units to select services and enter information such as account numbers, PINs, names and transaction values. Transaction data are sent to the broadcasting company along telephone lines, and then to the bank via proprietary lines.

2.13 Convenience store banking

Convenience stores accept payments from customers settling their bills from public utilities and telecommunications companies, and send them to the receiving companies by credit transfer. This payment acceptance service started in 1987 and the use of this service has been increasing. Since 1999, convenience stores have installed ATMs at their premises that have access to the ATM services of various banks, including in some cases access to consumer finance services. In 2001, a bank that has no branches and relies heavily on convenience store ATMs started operation. The number of in-store ATMs stood at more than 10,000 as of March 2002.

Such services are becoming popular due to the fact that convenience stores are more easily accessible than banks in terms of both location and business hours. Convenience stores are found everywhere and open 24 hours a day, seven days a week, while bank windows are generally available only during bank business hours on weekdays.

3. Interbank payment systems

3.1 General overview

There are four major interbank payment systems in Japan: (1) bill and cheque clearing systems (BCCSs); (2) the Zengin Data Telecommunication System (Zengin System); (3) the Foreign Exchange Yen Clearing System (FXYCS); and (4) the BOJ-NET Funds Transfer System. The first three systems are privately owned clearing systems. Net settlement positions of participating financial institutions, which are calculated by these clearing systems, are settled through current accounts at the Bank of Japan.

In general, BCCSs and the Zengin System are used mainly for smaller-value transfers, and the FXYCS and the BOJ-NET Funds Transfer System for larger-value transfers. These four systems are regarded as systemically important payment systems (SIPS), considering the total amount processed. In 2001, the average value per transaction for bills and cheques cleared by the Tokyo Clearing House was JPY 9 million (USD 74,000), for the Zengin System JPY 2 million (USD 16,000), for the FXYCS JPY 720 million (USD 6 million) and for the BOJ-NET Funds Transfer System JPY 3.8 billion (USD 31 million).

3.2 Bill and cheque clearing systems

Bill and cheque clearing systems (BCCSs) provide clearing services mostly for bills and cheques, which are exchanged between financial institutions located within the same geographical area.

The first clearing house in Japan was set up in Osaka in 1879; the Tokyo Clearing House was established in 1887. As of December 2001, there were 540 bill and cheque clearing houses throughout Japan, of which 173 were designated by the Minister of Justice. According to the Bill Law and the Cheque Law, presentation of bills and cheques at designated clearing houses is deemed a means of presentation for payment.²¹ More than 70% of the total value of bills and cheques exchanged in clearing houses throughout Japan is cleared by the Tokyo Clearing House, where a daily average value of JPY 2.6 trillion (USD 21.3 billion) was cleared in 2001.

3.2.1 Ownership

Major clearing houses are established and operated by their respective regional bankers' association. For example, the Tokyo Clearing House is operated by the Tokyo Bankers Association (TBA).

3.2.2 Participation

Large and medium-sized financial institutions, including banks and branches of foreign banks in Japan, participate in BCCSs directly. Small financial institutions participate in the systems indirectly through direct participants. As of December 2001, 421 institutions participated in the Tokyo Clearing House, of which 121 were direct participants.

3.2.3 Types of transaction

BCCSs mainly handle bills and cheques used for commercial transactions between firms. They also handle those used for financial transactions.

3.2.4 Operation of the system

Bills and cheques are cleared in the following manner: (1) bills and cheques are presented by payees at payees' banks; (2) these items are passed on to clearing houses; (3) the net positions of

²¹ Presentation of bills and cheques at non-designated clearing houses (ie those not designated by the Minister of Justice) is also deemed a means of presentation for payment under agreements between the relevant parties.

participating banks are calculated at the clearing houses; and (4) payers' banks bring back bills and cheques from the clearing houses.

3.2.5 Settlement

The net positions of participants calculated by each clearing house are settled at the settlement bank designated by the clearing house.

In the case of 33 clearing houses, settlement of participants' net positions resulting from bill and cheque clearing takes place through the current accounts that their respective regional bankers' association holds with the Bank of Japan. Funds are first transferred from the accounts of participants with net debit positions to the account of the regional bankers' association and, after completion of such transfers, the funds are then transferred from the account of the regional bankers' association to the accounts of participants with net credit positions. This process is performed through the BOJ-NET Funds Transfer System on an RTGS basis at 12:30. Interbank settlement is final once the net positions of participants are settled through the BOJ-NET Funds Transfer System. In general, however, the payee cannot withdraw funds until 13:00 on the business day following interbank settlement, because dishonoured bills or cheques may be returned from the payer's bank to the payee's bank until 11:00 on that day.

3.2.6 Risk management

There is no limit placed upon the size of the settlement obligation arising from bill and cheque clearing to which a participant may become liable. Should a participant fail to settle its net obligation, the clearing house is expected to promptly exclude the transactions involving the defaulting participant and then to recalculate the net positions of the remaining participants.

3.2.7 Technical aspects

The Tokyo Clearing House began automation of the clearing process in 1971 with the incorporation of computers and facilities that read and sort bills and cheques. All processing of "magnetic ink character recognition"-printed (MICR-printed) bills and cheques presented at banks has since been automated, including sorting these items according to the payer's bank and calculating receipts, payments and the net position of each bank. Meanwhile, most clearing houses process bills and cheques manually.

3.2.8 Pricing policies

In the case of the Tokyo Clearing House, a participant that is not a member of the TBA pays an admission fee to become a participant in the Tokyo Clearing House. Direct participants bear the operational cost of the Tokyo Clearing House in proportion to the volume of their transactions during the previous year.

3.2.9 Governance

Although each clearing house sets its own rules, clearing houses have been encouraged to harmonise their rules to enhance the efficiency of financial institutions' cash management. For example, the standard settlement time of 12:30 has been adopted. Any revision to the rules of the clearing houses that use the central bank accounts for settlement requires the approval of the Bank of Japan.

3.3 Zengin Data Telecommunication System

The Zengin Data Telecommunication System (Zengin System), an interbank clearing system for domestic funds transfers, started operation in 1973. In 2001, the system handled a daily average volume of 5 million transactions, while the daily clearing value averaged JPY 10 trillion (USD 82 billion).

Small financial institutions, ie *shinkin* banks, credit cooperatives, labour credit associations, agricultural cooperatives and a group of regional banks, have their own interbank clearing systems. The structure of each of these systems is similar to that of the Zengin System.

3.3.1 Ownership

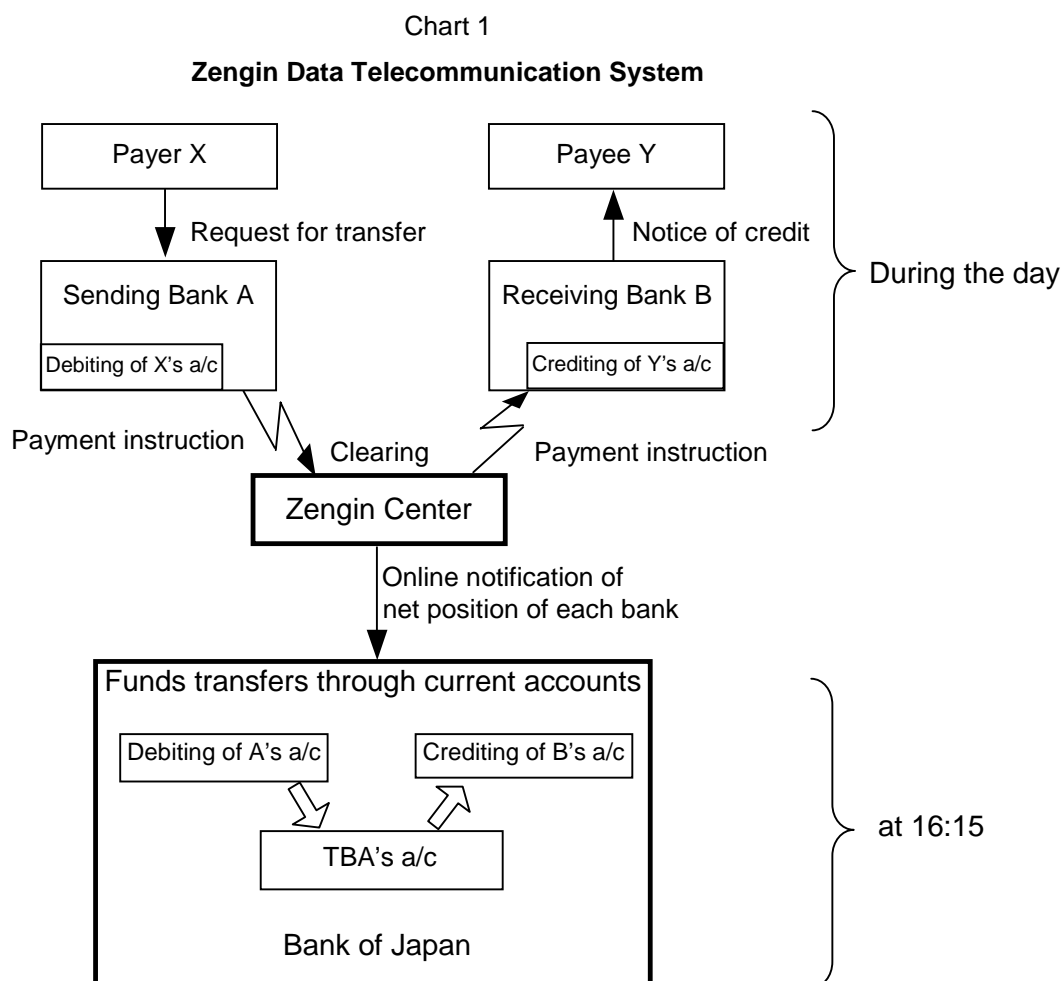
The Zengin System is operated by the TBA.

3.3.2 Participation

Financial institutions such as banks and branches of foreign banks in Japan participate directly in the Zengin System. Small financial institutions participate in the system through their respective clearing systems, which are linked with the Zengin System. As of December 2001, 2,021 institutions were participating in the system, of which 154 were direct participants. End users include firms and individuals. The Zengin System is not linked with the postal funds transfer system.

3.3.3 Types of transaction

The Zengin System clears domestic funds transfers for third parties, where not only sending banks and receiving banks but also payer customers and/or payee customers are involved. Transactions of this type include remittances, direct credits such as the payment of salaries and pensions, and payments resulting from the inter-regional collection of bills and cheques.



3.3.4 Operation of the system

Payments are processed through the Zengin System in the following manner (see Chart 1 above):

- (1) The payer requests the sending bank to make a funds transfer.
- (2) The sending bank accordingly sends a payment instruction to the Zengin Centre, which, in turn, sends the instruction to the receiving bank between 08:30 and 15:30. At the same time,

and on a transaction by transaction basis, the obligation between the sending bank and the receiving bank is replaced with two obligations: one between the sending bank and the TBA; the other between the receiving bank and the TBA.

- (3) Upon receiving the instruction, the receiving bank credits the payee's account.
- (4) Net debit or credit positions between each bank and the TBA are calculated within the system.
- (5) The Zengin Centre sends information on the net positions to the Bank of Japan using the Zengin System network.

3.3.5 Settlement

The net positions of participants of the Zengin System are settled through the BOJ-NET Funds Transfer System on an RTGS basis at 16:15.²² Funds are first transferred from the accounts of participants with net debit positions to the account of the TBA and, after completion of such transfers, the funds are then transferred from the account of the TBA to the accounts of participants with net credit positions.

Interbank settlement is final once the net positions of participants are settled through the BOJ-NET Funds Transfer System. Funds may, in many cases, become available to payees before interbank settlement takes place, because a receiving bank usually credits a payee's account upon receipt of a payment instruction from the Zengin Centre.

3.3.6 Risk management

In January 2001, the Zengin System introduced a set of new risk management measures to accommodate the Bank of Japan's introduction of a new RTGS system. Under the new scheme, the TBA acts as the central counterparty (CCP), and the obligations between participants are replaced with those between participants and the TBA.

Each participant is required to deposit collateral with the TBA equivalent to its sender net debit cap. Each participant can substitute all or part of the collateral with guarantees from other participants ("guarantor banks"). Guarantor banks need to deposit collateral with the TBA to cover the two largest guarantees they give.

Should a participant fail to settle its net obligation, the TBA will obtain necessary liquidity from banks assigned in advance as "liquidity provider banks", and complete settlement. Under this scheme, the 25 banks designated as liquidity provider banks would be able to cover a default by the two participants with the largest sender net debit cap. In order to repay liquidity provider banks the funds provided in an emergency, the TBA can sell in the market the collateral deposited by the defaulting participant. When the defaulting participant's collateral is substituted by guarantees, the guarantor banks for that participant will provide funds to repay liquidity provider banks.

3.3.7 Technical aspects

Participants in the Zengin System exchange payment instructions electronically via relay computers (RCs), which are installed either by participants or by joint centres for certain groups of financial institutions including various cooperatives. The Zengin Centre and the Bank of Japan are linked through the network of the Zengin System.

The computer facility of the Zengin System has been updated to meet the need for increased capacity. The current computer facility, in use since 1995, is the fourth generation. A fifth-generation computer facility is scheduled to start operation in November 2003. For operational resiliency, two sets of main computer systems have been operating separately in both Tokyo and Osaka since 1987, and they function as mutual backup facilities.

²² Due to the heavy traffic of instructions flowing through the Zengin System, on the last business day of each month settlement takes place at 17:15 with an hour longer window for instruction exchanges, and on the last business day of the year at 16:45 with a half-hour longer window for instruction exchanges.

3.3.8 Pricing policies

Each participant pays an admission fee to the TBA upon joining the Zengin System. The operational costs of the Zengin Centre, communication costs and 20% of the operational costs of each relay computer (RC) are borne by participants in proportion to the volume and value of their respective transactions. The remaining 80% of RC costs are borne by each participant using its RCs.

3.3.9 Governance

The Organization for the Management of Domestic Fund Transfers, established by the TBA, sets rules that govern the clearing procedures of the Zengin System. The Organization is required to consult with the Bank of Japan if any revisions are needed to the rules relating to settlement or membership criteria of the Zengin System.

3.4 Foreign Exchange Yen Clearing System

The Foreign Exchange Yen Clearing System (FXYCS) was established in 1980 to facilitate the clearing of yen payments for cross-border financial transactions. Originally, the system operated on a paper basis. To cope with the rapid growth of transaction volume, the TBA automated the system and consigned operation to the Bank of Japan in 1989. Clearing has since been conducted through the BOJ-NET. In 2001, the system handled a daily average volume of 39,000 transactions, while the daily clearing value averaged JPY 28 trillion (USD 230 billion).

3.4.1 Ownership

The FXYCS is owned by the TBA. The automated system is a part of the BOJ-NET.

3.4.2 Participation

At the end of 2001, 244 financial institutions, including 73 branches of foreign banks in Japan, participated in the FXYCS. Of these, 40 were direct participants which access the BOJ-NET directly, and the other 204 were indirect participants which participate in the system through direct participants.

3.4.3 Types of transaction

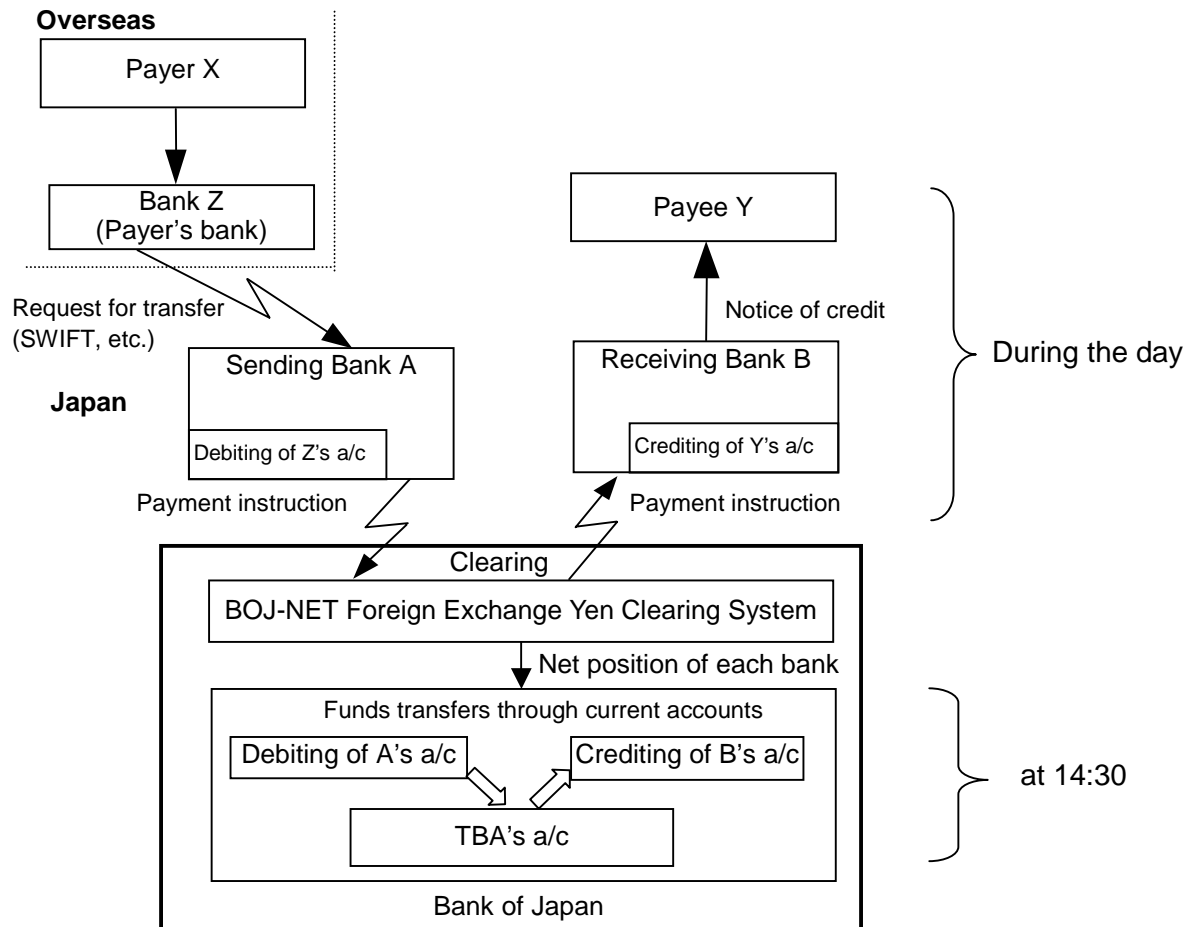
The FXYCS handles yen payments resulting from cross-border financial transactions including foreign exchange transactions, yen-denominated bond transactions and export-import payments.

3.4.4 Operation of the system

The following shows how payments are processed through the FXYCS (see Chart 2):

- (1) The payer in a foreign country instructs the payer's bank to make a yen payment to the payee in Japan.
- (2) The payer's bank requests a funds transfer, using SWIFT or telex, to its correspondent bank (sending bank) in Japan.
- (3) The sending bank sends a payment instruction to the BOJ-NET, which, in turn, sends the instruction to the receiving bank between 09:00 and 13:45. At the same time, and on a transaction by transaction basis, the obligation between the sending bank and the receiving bank is replaced with two obligations: one between the sending bank and the TBA; the other between the receiving bank and the TBA.
- (4) Upon receiving the instruction, the receiving bank credits the account of the payee.
- (5) On behalf of the TBA, the Bank of Japan calculates the daily net positions between each bank and the TBA using the BOJ-NET.

Chart 2
Foreign Exchange Yen Clearing System



3.4.5 Settlement

The net positions of participants of the FXYCS are settled through the BOJ-NET Funds Transfer System on an RTGS basis at 14:30. Funds are first transferred from the accounts of the participants with net debit positions to the account of the TBA and, after completion of such transfers, the funds are then transferred from the account of the TBA to the accounts of the participants with net credit positions.

Interbank settlement is final once the net positions are settled through the BOJ-NET Funds Transfer System. Funds may, in many cases, become available to payees before interbank settlement takes place, because a receiving bank usually credits a payee's account upon receipt of a payment instruction from the BOJ-NET.

RTGS mode is also available for participants' individual payments, although use of this mode is rather limited. All participants can use RTGS mode from 09:00 to 17:00 every business day, while the participants which made an advance application can use it until 19:00. In this mode, instructions sent to the Bank of Japan are processed on an individual basis immediately upon receipt, for settlement through current accounts held with the Bank.

3.4.6 Risk management

In December 1998, a set of new risk management measures was introduced to the FXYCS. Under the new scheme, the TBA acts as the CCP, and the obligations among participants are replaced with those between participants and the TBA. Each participant is required to set a net credit limit (NCL)

against every other participant on a bilateral basis. The sender net debit cap, placed to limit the total net amount of payments made by a participant, is 4.73% of the total amount of NCLs that the other participants set against that participant.

Should a participant fail to settle its net obligation, the FXYCS loss-sharing rule requires the remaining banks (“survivor banks”) to bear the net obligation of the defaulting participant in order to cover the shortfall in funds for the settlement. That is, the survivor banks must provide the TBA with funds allocated in proportion to their share of the NCLs set for the defaulting participant. In order to be prepared for such a contingency, each participant is required to deposit collateral with the TBA in advance. The amount of collateral required for each participant is set at the larger of (1) 5.1% of the largest NCL each participant has set against the other participants, or (2) JPY 100 million (USD 822,000).

Should a survivor bank be unable to provide the allocated amount in a timely manner, it may ask the TBA for a postponement. The TBA will then obtain the necessary liquidity from banks assigned in advance as “liquidity provider banks”, and complete settlement. The 10 banks designated as liquidity provider banks would be able to cover a default by the participant with the largest sender net debit cap. Should a survivor bank that has postponed its provision of funds fail to provide these to the TBA by 14:00 of the next business day following the default, the TBA can, if necessary, sell in the market the collateral deposited by the survivor bank and repay the liquidity provider banks.

3.4.7 Technical aspects

The whole clearing process is performed electronically via the BOJ-NET Foreign Exchange Yen Clearing System, which is a part of the BOJ-NET. Direct participants of the FXYCS access the system through BOJ-NET terminals installed on their premises. Direct connection between participants’ host computers and the host computer of the BOJ-NET (computer-to-computer connection) is also available.

3.4.8 Pricing policies

Financial institutions other than members of the Japanese Bankers Association pay admission fees to the TBA. Regarding annual operational costs, direct participants bear a large part, of which 20% is borne equally among them and 80% in proportion to the value of their transactions the previous year. Indirect participants bear the remaining part of the costs equally. In addition to the above costs, each direct participant pays JPY 60 (USD 0.5) per transaction as a transaction fee for using the BOJ-NET.

3.4.9 Governance

The TBA lays down rules for the FXYCS that stipulate membership criteria, procedures for entry to and withdrawal from the FXYCS and clearing procedures. Any revision to the rules requires the Bank of Japan’s approval.

3.5 BOJ-NET Funds Transfer System

The BOJ-NET Funds Transfer System is an online electronic funds transfer system introduced in 1988. The BOJ-NET comprises two systems: a system for funds transfers (BOJ-NET Funds Transfer System) and a system for the settlement of JGBs (BOJ-NET JGB Services). Although the BOJ-NET Funds Transfer System originally offered both designated-time settlement mode and RTGS mode for the settlement of funds, the Bank of Japan abolished designated-time settlement and made RTGS the only available settlement mode at the beginning of 2001. The daily volume and value of transactions settled through the BOJ-NET Funds Transfer System averaged 21,000 transactions and JPY 77 trillion (USD 634 billion) in 2001.

3.5.1 Ownership

The BOJ-NET Funds Transfer System is owned and operated by the Bank of Japan.

3.5.2 Participation

At the end of 2001, there were 383 participants in the BOJ-NET Funds Transfer System, including 162 banks, 72 branches of foreign banks in Japan, 83 *shinkin* banks, five central organisations of cooperatives, 46 securities companies, three money market brokers and other institutions such as stock exchanges. Sufficient operational reliability is required for the Bank of Japan's current account holders to participate in the system.

3.5.3 Types of transaction

The BOJ-NET Funds Transfer System offers most of the payment services provided by the Bank of Japan, which are: (1) funds transfers between financial institutions stemming from interbank money market and securities transactions; (2) funds transfers between different accounts of the same financial institution;²³ (3) settlement of net positions arising from privately owned clearing systems; and (4) funds transfers between financial institutions and the Bank of Japan, including those for open market operations. Most funds transfers made through the BOJ-NET Funds Transfer System are credit transfers, but in the case of in-house funds transfers, debit transfers can also be made. A sending bank can transmit a payment instruction with information regarding its and/or the receiving bank's customers.

3.5.4 Operation of the system

Almost all interbank transactions settled through the current accounts held with the Bank of Japan are processed on an RTGS basis.²⁴ Operating hours of the BOJ-NET Funds Transfer System are from 09:00 to 17:00 for all participants and from 09:00 to 19:00 for those which made an advance application every business day. Net positions stemming from privately owned clearing systems are settled on an RTGS basis at the following times: 12:00 for TIFFE; 12:30 for BCCSs; 14:30 for the FXYCS; and 16:15 for the Zengin System.

Part of BOJ-NET participants' payments to and receipts from the Bank of Japan are netted out on a bilateral basis between participants and the Bank, and the resulting net settlement positions of participants are credited to or debited from their current accounts with the Bank simultaneously and independently at designated times. This settlement mode, called "simultaneous processing", takes place at 09:00, 13:00, 15:00 and 17:00.²⁵

3.5.5 Settlement

Settlement is final once effected through the BOJ-NET Funds Transfer System.

The Bank of Japan started providing an intraday overdraft facility in January 2001 in order to facilitate smooth settlement on an RTGS basis. Intraday overdrafts are available to all current account holders without charge if repaid by the end of the day. Intraday overdrafts are also available as part of a scheme for the simultaneous processing of DVP and collateralisation (SPDC) (see Section 4.2.2.2).

3.5.6 Risk management

To reduce systemic and other risks inherent in designated-time settlement, the Bank of Japan abolished designated-time settlement in January 2001 and made RTGS the only available settlement mode for funds transfers through its current accounts. The intraday overdraft is fully collateralised with eligible assets pledged with the Bank. Collateral is weekly marked to market with haircuts, which vary

²³ Financial institutions are able to hold current accounts with different offices (head office and regional branches) of the Bank of Japan.

²⁴ The only exception is payments for DVP settlement of corporate and other bond transactions, which are settled simultaneously at 15:00.

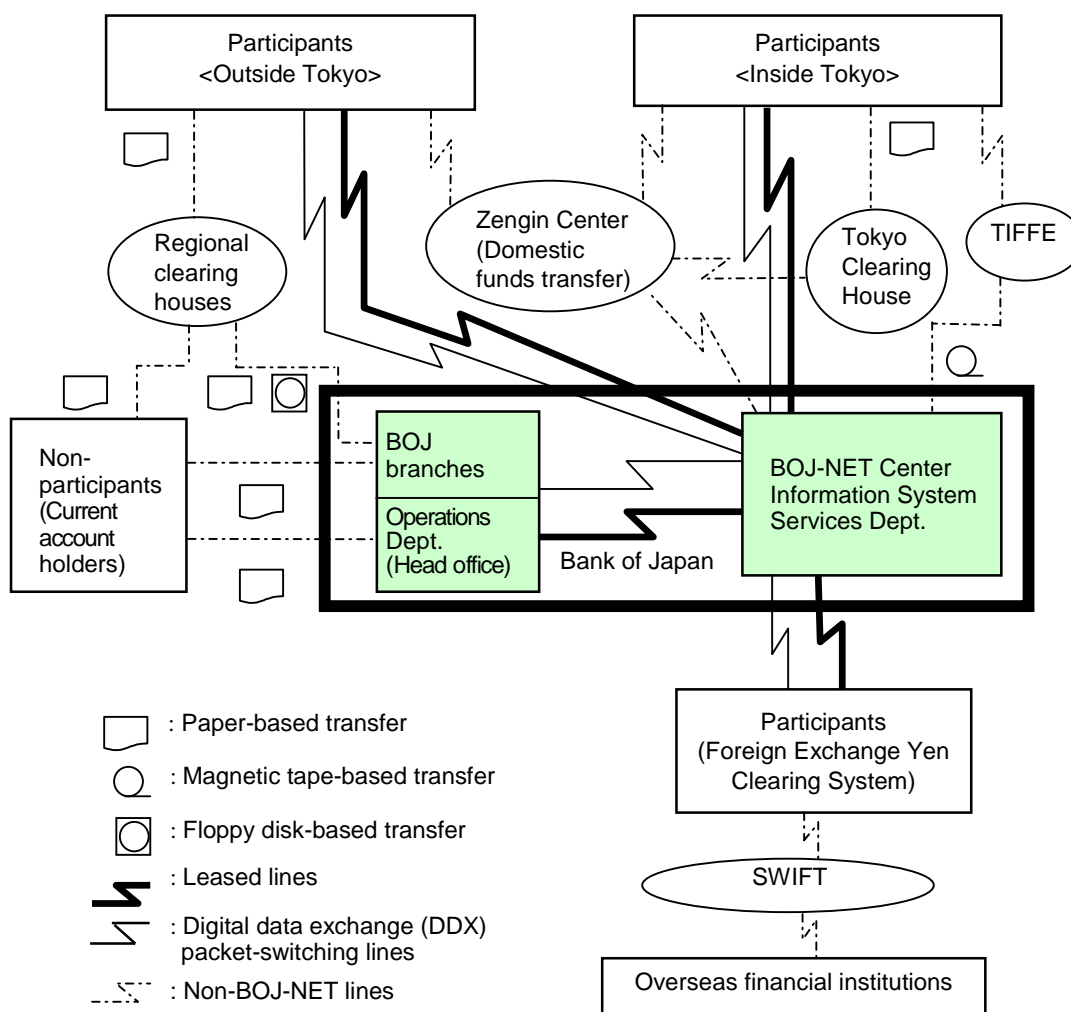
²⁵ On days when settlement for the Zengin System takes place at 16:45 or 17:15, the closing time of the BOJ-NET Funds Transfer System is extended to 17:30 or 18:00 respectively for all participants, and the end-of-day simultaneous processing, which usually takes place at 17:00, takes place at 17:30 or 18:00.

according to the type of security and residual maturity. No quantitative limit is currently imposed on the amount of intraday overdraft.

Contingency measures are in place to cope with hardware and software malfunctions. The host computer systems at the BOJ-NET Centre are duplicated to ensure safety. Both systems, system A and system B, use identical equipment, and each system comprises an active machine and a hot standby machine. In other words, four host computers are always ready for operation. Most peripheral equipment, such as the communication control unit and database, is also duplicated. A backup centre for the BOJ-NET has also been set up in Osaka. Operation of the BOJ-NET is constantly monitored at the computer centre to detect problems at the earliest possible stage. The Bank also uses passwords, ID cards and data encryption to ensure security of the information passed over the network.

Chart 3

Bank of Japan Financial Network System



3.5.7 Technical aspects

The Bank of Japan offers BOJ-NET participants several ways to access the BOJ-NET, and participants can choose the way that best suits their operations. The majority of participants access the BOJ-NET through dedicated BOJ-NET terminals. In order to streamline participants' operations

with respect to a large volume of transactions, in addition to the NTC²⁶ file transfer function and floppy disk data exchange function using BOJ-NET terminals, computer-to-computer connections are also available. Most major financial institutions use computer-to-computer connections for their operations.

The system network is based on leased lines and “digital data exchange” (DDX) packet-switching lines, which are provided by the NTT Group, a Japanese common carrier. These two types of line are connected with host computers at the BOJ-NET Centre; leased lines are used for computer-to-computer connections, while DDX packet-switching lines are used for linkages with BOJ-NET terminals. To ensure continuity of service, lines connecting the BOJ-NET Centre and participants for computer-to-computer connections are duplicated. Lines connecting the BOJ-NET Centre and telephone exchanges for linkages with BOJ-NET terminals are also duplicated (see Chart 3 above for the structure of the BOJ-NET).

In January 2002, the Bank released for public comment a proposal for further improving the network infrastructure of the BOJ-NET, to accommodate innovations in network technology and the standardisation of message formats. Specific plans include: (1) improving computer-to-computer connections (eg adoption of TCP/IP); (2) enabling PC-based connection; and (3) ensuring flexibility with regard to message format by adjusting the system to accept formats based on the international standard. Following public consultation, the Bank decided in March 2002 to implement its proposal.

3.5.8 Pricing policies

Regarding costs for the BOJ-NET, the costs of linkage with the BOJ-NET and for using its circuits are borne by participants, which benefit from online processing through the BOJ-NET. On the other hand, the Bank of Japan bears other costs such as the purchasing/leasing costs of computers and programming costs, which improve the Bank’s operational infrastructure.

The cost of using the BOJ-NET incurred by participants in the system comprises two parts: monthly-fixed charge and transaction fees. Participants pay a fixed charge for linkage with the BOJ-NET: JPY 5,000-10,000 (USD 40-80) per line for connection via terminals and JPY 800,000 (USD 6,600) per line for computer-to-computer connection. Transaction fees for the BOJ-NET Funds Transfer System are JPY 40 (USD 0.3) for ordinary funds transfers and JPY 60 (USD 0.5) for third-party funds transfers.

3.5.9 Governance

The Bank of Japan reviews the design and operation of the BOJ-NET on the basis of international standards such as the Core Principles for Systemically Important Payment Systems drafted by the Committee on Payment and Settlement Systems (CPSS) of the central banks of the Group of Ten countries. Based on these review findings, the Bank of Japan then develops an improvement plan for the BOJ-NET and implements it following approval by the Policy Board, the governing body of the Bank. The Bank of Japan makes the plan public and seeks comment from system participants where necessary. The Operations Department and the Information System Services Department are in charge of the BOJ-NET operations. The Bank’s Executive Auditors and the Internal Auditors’ Office audit and examine the Bank’s operations, including issues relevant to the BOJ-NET.

4. Securities settlement systems

4.1 General overview

There are central securities depositories (CSDs) for Japanese government bonds (JGBs) and stocks (these are the Bank of Japan and the Japan Securities Depository Centre (JASDEC) respectively), but not for other types of bonds or commercial paper (CP). JGB transactions are settled on a real-time delivery versus payment (DVP) basis through the BOJ-NET JGB Services, an online system for

²⁶ *Nichigin* Terminal Control equipment.

transferring JGBs between financial institutions. Transactions in stocks deposited at JASDEC are settled by book entries, and DVP is available for stocks traded on the exchanges. Corporate and other bonds such as government-guaranteed bonds and municipal bonds are registered and transferred on the books of a number of registrars. An online network system called JB Net links participants (investors and dealers), registrars and the Bank of Japan, and enables settlement of these registered bond transactions to be processed on a DVP basis. Although there has not been a CSD for CP, a book-entry system developed by JASDEC is expected to start settlement of CP transactions on a real-time DVP basis from March 2003 under the new legal framework.

Settlement cycles vary depending on the type of security. T+3 rolling settlement is the norm for corporate bonds, municipal bonds, stocks and JGBs, although settlement of JGBs for open market operations takes place T+0, T+1, T+2 and T+3.²⁷ The settlement cycle for CP is T+1 or T+2.

4.2 Japanese government bonds and bills

4.2.1 Trading

The outstanding balance of securities issued by the Japanese government was JPY 461 trillion (USD 3.5 trillion) at the end of 2001, which comprised JPY 387 trillion (USD 2.9 trillion) in JGBs, JPY 31 trillion (USD 236 billion) in treasury bills (TBs) and JPY 43 trillion (USD 327 billion) in financing bills (FBs). The value of JGB transactions in the over-the-counter (OTC) market reached JPY 3,863 trillion (USD 31.8 trillion) during 2001, accounting for 95% of cash bond transactions.²⁸ The volume of JGB transactions effected through a variety of screen-trading systems began to grow from mid-2000.

Repo transactions²⁹ are actively made between various entities including securities companies, banks, insurance companies, investment trusts and other corporations. Prior to April 2001, there were two types of repo transactions in the Japanese repo market, namely *gensaki* (buy/sellback transactions which did not incorporate risk management measures such as margining and closeout netting) and cash-collateralised bond lending.

The JGB lending market has grown tremendously since the abolition of restrictions on cash-collateralised bond lending in 1996, and cash-collateralised bond lending is currently the predominant transaction in the repo market. At the end of 2001, the outstanding amount of bond lending transactions totalled JPY 46.4 trillion (USD 353 billion), of which the bulk - JPY 40.2 trillion (USD 306 billion) - consisted of cash-collateralised bond lending.

In addition to the two types of repo transactions above, a new type of repo transaction (repurchase agreement), which is almost the same as repos in the US and European markets, was introduced to replace *gensaki* in April 2001. After the introduction of repurchase agreements, *gensaki* transactions were abolished in March 2002.

4.2.2 Clearing and settlement

There is no major trade confirmation system or clearing system for JGB transactions in the OTC market. However, there are plans to extend the confirmation services offered in the pre-settlement matching system operated by JASDEC to include JGB transactions. Also, market participants and relevant parties have been conducting a feasibility study for the introduction of a CCP mechanism in OTC JGB transactions.

There are two arrangements for the settlement of JGBs without physical delivery: the JGB Registration System and the JGB Book-entry System. Physical delivery of certificates is also possible, but rarely occurs.

²⁷ JGB transactions include those involving both treasury bills (TBs) and financing bills (FBs).

²⁸ Total of purchases and sales including *gensaki* transactions.

²⁹ Transactions that involve the exchange of securities for funds for a certain period.

The JGB Registration System was introduced in 1906 with the Bank of Japan as the registrar, based on the Law Concerning Government Bonds. In this system, registrations are made on the book kept at the registrar, so that JGBs are transferred without physical delivery. Participants are not limited to financial institutions; any JGB holder can use the system. In recent years, participants have been shifting their holdings of JGBs from the JGB Registration System to the JGB Book-entry System, due largely to the relevant tax reforms.³⁰

The JGB Book-entry System was introduced in 1980 in response to the rapid growth of the volume of JGB transactions and their settlement. It is a tiered system, consisting of direct participants, indirect participants, foreign indirect participants, customers and the depository, namely the Bank of Japan. There are requirements set by the Bank of Japan for participation in the JGB Book-entry System (see Section 1.2.2). Direct participants, indirect participants and foreign indirect participants include financial institutions such as banks and securities companies. The deposit rate³¹ in the JGB Book-entry System was 99% at the end of 2001.

The daily average volume and value of transactions settled during 2001 were 11,500 transactions and JPY 42 trillion (USD 346 billion) for the JGB Book-entry System, and 94 transactions and JPY 60 billion (USD 494 million) for the JGB Registration System.

JGB transfers under the JGB Registration System and the JGB Book-entry System are processed through the BOJ-NET JGB Services, an online system for the transfer of JGBs, owned and operated by the Bank of Japan. The BOJ-NET JGB Services began operation in 1990, and the DVP mechanism was introduced in 1994 by connecting the BOJ-NET JGB Services with the BOJ-NET Funds Transfer System.

Participants in the JGB Registration System or the JGB Book-entry System can give instructions regarding JGB delivery to the Bank of Japan, either in paper form or online through the BOJ-NET JGB Services. At the end of 2001, the number of users of the BOJ-NET JGB Services was 360 for the JGB Book-entry System and 398 for the JGB Registration System. Operating hours of the BOJ-NET JGB Services are from 09:00 to 16:30.

Since 1997, settlement of JGB transactions has been taking place on a T+3 basis.³² Before rolling settlement was introduced in 1996, JGBs were settled in principle on the 5th, 10th, 15th, 20th, 25th and the last business day of every month as a market practice in which the average period between trade and settlement was around seven days.

4.2.2.1 *Changeover to the RTGS system*

The Bank of Japan provided two different modes for settlement of JGBs - real-time gross settlement (RTGS) and designated-time settlement - until January 2001, when it abolished designated-time settlement and made RTGS the only available mode for settlement. After the changeover, settlement through the BOJ-NET JGB Services took place on an RTGS basis with the following three exceptions, which were settled simultaneously at 15:00: (1) transactions involving JGBs kept in custody with the Bank of Japan by foreign central banks and international organisations; (2) JGB issuance for which payments are made online; and (3) JGB transactions involving the Bank of Japan or the government as the buyer or borrower, and outright purchases/sales of TBs/FBs in the Bank's open market operations. In April 2001, however, the Bank of Japan published its Schedule for Additional Measures Relating to Real-Time Gross Settlement of Japanese Government Securities Transactions, in which it laid out a schedule for switching to RTGS for these types of transactions. Switching has been proceeding according to this schedule (for example, JGB issuance for which payments are made

³⁰ The exemption from withholding tax on interest payments on JGBs is granted only to book-entry JGBs held by designated financial institutions, and by non-residents of Japan and foreign corporations.

³¹ The ratio of the outstanding amount of book-entry JGBs, TBs and FBs to the total outstanding amount of JGBs, TBs and FBs. That of registered JGBs was 0.7%. Both TBs and FBs can only be held in the JGB Book-entry System.

³² T+3 is the norm for outright transactions. Most repo transactions are settled on a T+2 or T+3 basis.

online (ie (2) above) has been processed on an RTGS basis since June 2002), and so far the majority of these exceptions have been removed.³³

4.2.2.2 *Liquidity-saving facility*

To facilitate smooth settlement of a large volume of JGB transactions on a real-time DVP basis, the Bank of Japan started providing a liquidity-saving facility, or simultaneous processing of DVP and collateralisation (SPDC), with the changeover to the RTGS system in January 2001.

Using SPDC, a participant in the BOJ-NET JGB Services may post the securities traded in DVP transactions as collateral to the Bank of Japan to obtain an intraday overdraft needed for payments for the transactions concerned. For example, in the case of JGB purchases, a buying participant is able to do the following at the same time: (1) receive JGBs from a seller; (2) pledge these JGBs to the Bank as collateral for an intraday overdraft; (3) draw the intraday overdraft from the Bank; and (4) pay for the JGBs received from the seller with the intraday overdraft. A selling participant is able to do the following at the same time: (1) receive the pledged JGBs from the Bank; (2) deliver these JGBs to a buyer; (3) receive from the buyer the proceeds from the JGBs sold; and (4) repay the intraday overdraft to the Bank with the proceeds received in (3). These two sets of processes take place at the same time when both the buyer and the seller of the JGBs use SPDC.³⁴

To use SPDC, a participant in the BOJ-NET Funds Transfer System must open a special current account at the Bank of Japan, separate from its ordinary current account. A participant may transfer funds between the ordinary current account and the special current account for SPDC. The use of special current accounts is limited to the operating hours of the BOJ-NET JGB Services, which are shorter than those of the BOJ-NET Funds Transfer System (see Section 3.5.4). Participants are required to return the balance of their special current accounts to zero prior to the BOJ-NET JGB Services' closing time.

4.2.2.3 *Conversion to the New JGB Book-entry System*

From 27 January 2003, the JGB Book-entry System is scheduled to begin operations under the Transfer of Corporate Debt Securities Law enacted in June 2002, although this is subject to the fulfilment of certain conditions, such as the Bank's designation as an eligible operator ("transfer institution") by the competent ministers. Under the new system, JGBs, TBs and FBs will be fully dematerialised (rather than immobilised as in the existing system), and transfer of these securities will be effected by book entries based on the new law, while the basic mechanism of settlement will not change. The conversion to the new system will achieve greater efficiency of safekeeping and settlement of JGBs, TBs and FBs. It will also make the legal structure of book-entry transfers easier to understand than under the existing system, in which book-entry transfers are governed by contracts between the Bank and system participants under general private laws.

4.3 **Corporate and other bonds**

4.3.1 **Trading**

Corporate and other bonds (ie non-JGB bonds), such as government-guaranteed bonds, municipal bonds, bank debentures and yen-denominated foreign bonds, are mainly traded in the OTC market, as is the case for JGBs. The outstanding amount of corporate and other bonds was JPY 191 trillion (USD 1.5 trillion) at the end of 2001, and the total trading value of OTC corporate and other bonds during 2001 was JPY 188 trillion (USD 1.5 trillion).³⁵

³³ The remaining transactions, which will also switch to RTGS within a few years, include delivery of book-entry JGBs to foreign central banks and international organisations as well as outright purchases/sales of TBs/FBs in the Bank's open market operations.

³⁴ For more details, see Bank of Japan, *Framework for restructuring BOJ-NET JGB Services*, September 1998 (available on the Bank's website).

³⁵ The total value of purchases and sales of corporate bonds, government-guaranteed bonds, municipal bonds, bank debentures and yen-denominated foreign bonds.

4.3.2 Clearing and settlement

Under the Law on Registration of Corporate and Other Bonds, almost 80%³⁶ of the outstanding amount of corporate and other bonds is held in the form of registered bonds at registrars. The registrars differ from issue to issue, and about 160 banks currently act as registrars. Physical certificates of corporate and other bonds are brought to the registrars and registered in non-paper form. The serial numbers assigned to every physical certificate are recorded on the registration books of the registrars, and registered corporate and other bonds are managed and handled according to these numbers. Delivery of registered corporate and other bonds is processed by changing the holders' names on the registration books kept by the registrars (transfer registration) in accordance with the requests of both sellers and buyers.

The Japan Bond Settlement Network Co, Ltd (JB Net) operates an online network system that links participants (investors and dealers), registrars and the Bank of Japan. DVP is achieved using the network in the following way: (1) when a seller agrees to sell a bond to a buyer, the buyer produces a "message authentication code" (MAC)³⁷ and transmits it to the seller; (2) the seller submits a delivery instruction with the buyer's MAC to JB Net; (3) JB Net checks the data in the instruction and transmits the necessary information to the registrar;³⁸ (4) in addition to dealing with the delivery instruction, JB Net produces separate data on the cash leg of the settlement and sends them to the BOJ-NET; (5) based on this information, the Bank advises the buyer or seller of the net amount to be credited to or debited from their current accounts at the Bank; (6) the buyer notifies the Bank of its acceptance of payment, and settlement of the cash leg takes place at 15:00³⁹ on the settlement day; and (7) when the settlement of the cash leg is completed, the Bank transmits the settlement result to JB Net, which transmits the result to the registrar, who makes transfer registration of the corresponding security. In 2001, the daily average volume and value of transactions processed through JB Net were 574 transactions and JPY 276 billion (USD 2.3 billion) respectively.

JASDEC and market participants are planning to introduce a book-entry system for corporate and other bonds under the Transfer of Corporate Debt Securities Law.

Corporate and other bond transactions have been settled on a T+3 basis since 1999. Before rolling settlement was introduced for corporate and other bonds in 1997, they had been settled on the 10th, 20th and the last business days of every month.

4.4 Commercial paper

4.4.1 Trading

The commercial paper (CP) market has grown significantly since its inception in 1987. The deregulation that took place in 1998, enabling CP issuance by banks and direct issuance of CP by corporations to end-investors (known as direct issuance), contributed significantly to this growth. The outstanding amount of CP was JPY 16.5 trillion (USD 126 billion) at the end of 2001. Financial institutions such as banks, securities companies and money market brokers actively engage in repo transactions of CP, accounting for almost all the transactions in the secondary market.

³⁶ This refers to the ratio of the outstanding balance of registered corporate and other bonds (or corporate and other bonds that are held in non-paper form) to the outstanding balance of corporate and other bonds, which was 79% at the end of March 1997.

³⁷ MAC is a numerical code, used instead of a signature or seal, to confirm the intent of the counterparty who does not provide online instructions for the transaction. It is calculated, using a special encryption method, from (1) an encryption key provided to each participant, and (2) the content of a given transaction request (details of the seller, buyer, issue, value, etc) represented in the form of a numerical value.

³⁸ JB Net transmits information about each delivery instruction to registrars via pre-settlement service institutions. The institutions examine the content of instructions, assign a bond serial number if necessary, rearrange the order of instructions, check the balance of the sellers' accounts and submit the delivery instructions to the registrars on the settlement day.

³⁹ All payments for DVP settlement of corporate and other bond transactions are settled simultaneously at 15:00 through the BOJ-NET Funds Transfer System.

4.4.2 Settlement

There is no CSD for CP. CP is usually issued without a named payee (known as blank bills) and is traded in the secondary market. In repo transactions, delivery of CP is normally effected by means of deposit receipts prepared by the seller, and CP certificates are physically held at dealers until redemption. Settlement of most CP transactions currently takes place on a T+1 or T+2 basis.

Dematerialised CP is expected to be issued and settled on a real-time DVP basis from March 2003, using a book-entry system that is being developed by JASDEC, under the Transfer of Corporate Debt Securities Law.

4.5 Stocks and convertible bonds

4.5.1 Trading

While there are five stock exchanges in Japan, the Tokyo Stock Exchange handles most of the transactions in listed stocks. In 2001, total trading value on the exchanges was JPY 225 trillion (USD 1.9 trillion), of which the Tokyo Stock Exchange accounted for 90%. Direct access to stock trading on the exchanges is limited to securities companies that meet the requirements and receive the approval of the exchanges. At the end of 2001, the total market value of listed stocks was JPY 301 trillion (USD 2.3 trillion), which was about half the value recorded at the end of 1989, reflecting the decline in stock prices.

The JASDAQ market is an OTC market managed by the Japan Securities Dealers Association (JSDA) in accordance with the provisions of the Securities and Exchange Law. Stock trading on this OTC market is processed and price information provided through the JASDAQ system. Since 1998, a market-maker system, in which trading is based on the quoted prices published by securities companies, has been gradually introduced to the JASDAQ market.

With regard to stock lending, the market has been rapidly expanding since the introduction of a new type of stock lending in 1998, whereby market participants were allowed to make lending transactions without the intermediation of securities finance companies which had been previously required. The outstanding amount of such lending transactions totalled JPY 3.3 trillion (USD 25.1 billion) at the end of 2001. Major participants in this market include securities companies, institutional investors and trust banks.

4.5.2 Clearing and settlement

Settlement of stock transactions currently takes place on a T+3 basis. A large portion of stock transactions, both in the exchange-traded and OTC markets, is settled by book entry at JASDEC. In fiscal 2001, the daily average volume of transactions settled over JASDEC was 146,900. Procedures regarding clearing and DVP arrangements, however, vary according to the type of transaction, and are summarised as follows.

4.5.2.1 Transactions on stock exchanges

Stock exchanges provide pre-settlement services such as trade confirmation and netting for transactions that are conducted on the exchanges.

For stock transactions on the Tokyo Stock Exchange, the Osaka Securities Exchange and the Nagoya Stock Exchange, the exchanges themselves act as central counterparties (CCPs). These three exchanges bilaterally offset obligations vis-à-vis their respective participants, thereby achieving multilateral netting among participants. In this process, obligations to deliver stocks are netted by issue, and obligations to transfer funds are netted across all issues.

With regard to stock transactions made on the other two exchanges, obligations to deliver stocks are netted on a multilateral basis by issue, and obligations to transfer funds are netted on a multilateral basis across all issues. In a legal sense, however, these exchanges do not function as CCPs.

Regarding stock transactions on the Tokyo Stock Exchange and the Osaka Securities Exchange, DVP⁴⁰ was achieved in May 2001 by linking the delivery of stocks at JASDEC with the settlement of funds at the Bank of Japan via each CCP. DVP settlement takes place in the following manner: (1) participants with net debit balances in securities are required to deliver securities to the account of the exchange held at JASDEC by 13:00; participants with net debit balances in funds are required to transfer funds to the account of the exchange held at settlement banks⁴¹ by 14:15; (2) after the exchange confirms receipt of securities and funds, it transfers these to participants with net credit balances in securities or funds respectively. The delivery of stocks traded on the other exchanges is also made through the book-entry system of JASDEC, but DVP has not been available.

4.5.2.2 Transactions in the JASDAQ market

Stock transactions on the JASDAQ market are confirmed by JASDAQ Market, Inc, the operator and the CCP of the JASDAQ market.

Transfers of both securities and funds take place on a gross basis, but DVP has not yet been achieved. Stocks are delivered from the seller to the buyer through the account of JASDAQ Market, Inc held at JASDEC. Funds are transferred from the buyer to the seller through the account of JASDAQ Market, Inc held at a designated settlement bank.

Starting in January 2003, stocks traded on all five exchanges and in the JASDAQ market are scheduled to be settled on a DVP basis, using the Japan Securities Clearing Corporation, a newly established unified CCP that will provide clearing services quite similar to those of the Tokyo Stock Exchange.

4.5.2.3 Other transactions⁴²

For confirmation of stock transactions by institutional investors, JASDEC has developed a pre-settlement matching system, which started operation in September 2001. Users of this system include investment trusts/advisories, trust banks, custodian banks and life/non-life insurance companies, as well as securities companies. In addition to stock transactions by domestic institutional investors, the system started handling cross-border transactions and trades in convertible bonds in February 2002.

JASDEC also effects settlements of the transactions between securities companies and institutional investors, although DVP is not yet available for these. Market participants and JASDEC, however, are currently considering introducing a DVP mechanism⁴³ for such settlements in 2004, utilising a CCP that will be newly established as a subsidiary of JASDEC.

4.6 Use of securities infrastructure by the central bank

The BOJ-NET JGB Services, an online transfer system of JGBs, is used for JGB-related services such as issuance and payment of principal and interest, as well as for settlement of JGB transactions between financial institutions. The BOJ-NET JGB Services provides online processing of JGB issuance, from announcement of auction to initial deposit of newly issued JGBs, enabling relevant funds transfers between the government and financial institutions to be processed efficiently. In addition, for the Bank of Japan's open market transactions to be settled smoothly, the BOJ-NET JGB Services is connected with the Bank's systems for open market operations, which handle services such as announcement of offers, acceptance of bids and notification of results.

⁴⁰ Transfer instructions for both securities and funds are settled on a net basis.

⁴¹ The Bank of Japan is one of the settlement banks.

⁴² Transactions outside the stock exchanges and the JASDAQ market, including those between securities companies and institutional investors.

⁴³ Securities transfer instructions are settled on a gross basis and funds transfer instructions are settled on a net basis.

The BOJ-NET JGB Services is also utilised for managing securities pledged by financial institutions as collateral for the Bank's credit extension.⁴⁴ The majority of the pledged securities are JGBs, while various other securities, including corporate bonds, municipal bonds, asset-backed securities and CP, are also eligible as collateral under certain conditions. In daily operations, for example, financial institutions post their book-entry JGBs to the Bank as collateral for an intraday overdraft or for some other liquidity provision by the Bank (this is carried out either well in advance or at the time when the overdraft or liquidity is actually to be used); they then receive the pledged JGBs from the Bank against repayment of the intraday overdraft or other liquidity provision by the Bank. To process and manage this series of operations efficiently, financial institutions use the BOJ-NET Credit-Collateral Management System, which was introduced in January 2001. This system is connected with the BOJ-NET JGB Services to achieve online processing of collateral transactions and credit extensions by the Bank including intraday overdrafts, electronic loans and purchases of bills, thereby facilitating the centralised management of these transactions.

4.7 Reform of securities settlement systems

4.7.1 Need for reform

It has been recognised that there is room for improvement in Japan's securities settlement systems in terms of safety and efficiency.

First, securities settlement has been conducted based on different laws for different types of securities, and there is no rule that uniformly covers settlement of all types of securities and allows securities to be dematerialised and settled by book entry. This has resulted in complexity in securities settlement systems, and has also been an impediment to improving the settlement of securities such as CP and corporate bonds.

Second, DVP has not been available for some types of securities such as CP and stocks traded outside the exchanges. Given the significant systemic implications of settlements and corresponding payments for such securities, implementation of DVP in this area is essential.

Third, the move towards shorter settlement cycles and further progress in straight through processing (STP), which is useful for the realisation of shorter settlement cycles, has been slow compared to other major markets. This may lead to a delay in reducing market exposure and counterparty risk related to securities transactions.

4.7.2 Recent developments

With respect to the legal framework, the Law Concerning Book-Entry Transfer of Short-Term Corporate Debt Securities was enacted in June 2001 (effective from April 2002), allowing the establishment of a book-entry system without a tiered structure (ie a direct holding system without intermediaries) for dematerialised CP. The law was amended and renamed the Law Concerning Book-Entry Transfer of Corporate and Other Debt Securities in June 2002 (effective from January 2003), enabling dematerialisation and book-entry transfers in a tiered structure system for various types of debt securities including CP, corporate bonds and JGBs. In addition, the amended Securities and Exchange Law will provide a legal and regulatory framework for clearing institutions (CCPs) for securities trades from January 2003.

In addition to the legal aspect above, relevant parties have made steady efforts with respect to the following: (1) establishment of book-entry systems for CP and corporate and other bonds; (2) introduction of a DVP mechanism for transactions in CP and stocks traded outside the exchanges; (3) establishment of CCPs for stocks on and off the exchanges and for JGBs; and (4) realisation of STP by introducing systems for trade or pre-settlement confirmation for various types of securities.

⁴⁴ The Bank made public in October 2000 its Guidelines on Eligible Collateral stating the principles, categories, and prices of collateral, as well as the eligibility standards for its collateral management. Eligibility of collateral is based on the following principles: (1) maintaining the soundness of the Bank's assets; (2) ensuring smooth business operation of the Bank and efficient use of collateral; and (3) utilising market information. Categories of eligible collateral include various securities such as JGBs, government-guaranteed bonds, municipal bonds, corporate bonds, bills, CP and loans on deeds.

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**Payment systems in
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List of abbreviations

AEX	Amsterdam Exchanges
Au-FM	Authority for Financial Markets - <i>Autoriteit Financiële Markten</i>
BXS	Brussels Exchanges
CSS	Clearing and Settlement System (Interpay)
DNB	Netherlands Bank - <i>De Nederlandsche Bank</i>
DSI	Dutch Securities Institute
Interpay	Net settlement system for low-value payments
Necigef	Dutch CSD - <i>Nederlands Centraal Instituut voor Giraal Effectenbedrijf</i>
NIEC	Dutch Interprofessional Securities Centre - <i>Nederlands Interprofessioneel Effectencentrum</i>
NSC	<i>Nouveau Système de Cotation</i> , a French trading system
NVB	Netherlands Bankers' Association - <i>De Nederlandse Vereniging van Banken</i>
PVK	Pension and Insurance Board - <i>Pensioen- en Verzekeringskamer</i>
STE	Securities Board of the Netherlands - <i>Stichting Toezicht Effectenverkeer</i>
Switch	Order routing system on the Euronext Amsterdam Derivative Markets
TES	TOP End Station
TOP	RTGS system operated by DNB
VEB	Association of Stockholders - <i>Vereniging van Effectenbezitters</i>
Wtb	Act on the Supervision of Collective Investment Schemes - <i>Wet toezicht beleggingsinstellingen</i>
Wte	Act on the Supervision of Securities Trade - <i>Wet toezicht effectenverkeer</i>
Wtk	Act on the Supervision of Credit Institutions - <i>Wet toezicht kredietinstellingen</i>

Introduction

As with other payment systems around the world, technological innovation and evolving payment methods have influenced the Dutch payment system and led to a substantial decrease in the use of paper-based instruments. For point of sale payments the use of debit cards is still rising. In 2002 over 1 billion purchases at the point of sale will have been made by the electronic transfer of funds, that is about one third of all non-cash payments. For remote payments the key characteristics remain largely the same. The Netherlands relies very heavily on credit transfers or giro payments. Cheques are hardly used any more, either for remote or for point of sale payments. The majority of Dutch households and businesses hold more than one payment account. In August 2002, over 16 million inhabitants held over 21 million accounts.

Retail payment services are provided by most of the commercial banks. All the banks together process around 3 billion cashless retail payments each year. The Dutch payment services market is quite concentrated, as is the banking market as a whole. The bulk of private customer accounts are held with just a few banks. In addition to the deposit-taking institutions offering a wide range of payment services, there are a few international credit card companies and retail chains offering credit card services.

Many of the retail payments are processed centrally at the automated clearing house Interpay, in which nearly all banks participate. No other interbank low-value payment system of substance exists.

Large-value payments are processed via TOP, the RTGS system, which is owned and operated by the Netherlands Bank. Although the TOP system is, in principle, intended to handle large-value interbank payments, there are in fact no upper or lower value limits for payments. This also applies to cross-border payments via TARGET, to which TOP is linked.

The Dutch SSSs (securities settlement systems) are undergoing a period of transition and will eventually become part of a pan-European system, since the Amsterdam Exchanges (AEX) have merged into Euronext. A single integrated market has been formed together with the other merging companies, the Brussels Exchanges (BXS) and Paris Bourse, comprising a cash market for equities and bonds, a derivatives market and a commodity market. The integration of trading, clearing and settlement is taking place in stages and is expected to be complete by the end of 2003.

1. Institutional aspects

1.1 The general institutional framework

1.1.1 *Institutions responsible for regulating, supervising and overseeing the financial infrastructure*

The institutions that are allowed to conduct banking activities fall under the Act on the Supervision of Credit Institutions (Wtk), while investment institutions fall under the Act on the Supervision of Collective Investment Schemes (Wtb). The Second Banking Co-ordination Directive, which states the principle of mutual recognition of (EU) banking licences, and the Investment Services Directive, which opens the European market for investment services, are legally binding in the Netherlands as well.

Banking supervision has traditionally been a responsibility of the Netherlands Bank, while the Pension and Insurance Board (PVK) carried out supervision of pension funds and insurance companies and the Securities Board (STE), which became the Authority for the Financial Markets (Au-FM) as from March 2002, supervised investment institutions. However, in view of international developments like consolidation in the financial sector and diversification, the organisation of supervision is being revised. The first phase of this revision, in which the supervisory framework evolved from the traditional sectoral model to a functional model, was completed on 18 September 2002. Supervision of the conduct of all supervised institutions, as well as supervision of the provision of information to the public, falls under the responsibility of Au-FM, while prudential control is in the hands of both DNB and PVK. To this end a partial merger between the two institutions has been undertaken, and members of the DNB and PVK Boards have taken up positions on the Board of each other's institution. The three

supervising institutions come together in the Council of Financial Supervisors. The relevant laws are expected to be passed by 2004.

The 1998 Bank Act, in accordance with the Statute of the ESCB, contains a provision stating that the national central bank, ie the Netherlands Bank, shall promote the smooth operation of the payment system. This means that the Netherlands Bank is responsible not just at an operational level, but also as an overseer, for ensuring that the payment system functions smoothly. Efforts are being made to draw up a law on the supervision of settlement systems. This so-called "Infrastructure Act" will create a supervisory framework on the basis of which standards developed in the G10 context can be imposed on payment and securities settlement systems with a view to fostering and maintaining financial stability and confidence in payment instruments.

1.1.2 The legal framework

In the Netherlands, the legal framework underlying payments and securities consists of several general laws as well as private law. An overview of the main provisions governing payments and securities can be found in the subsections below.

Legal aspects of payment media and the provision of payment services to the public

Pursuant to the 1998 Bank Act, banknotes are legal tender up to an unlimited amount, while under the 1987 Coinage Act coins are legal tender up to a limited amount. The 1992 Dutch Civil Code includes a stipulation to the effect that non-cash payments are legally equivalent to cash payments.

The External Financial Relations Act contains stipulations on external payments, such as the obligation to report certain transactions for balance of payments purposes.

The Act on Cross-Border Payment Services was designed to implement Directive 97/5/EC of the European Parliament and the EU Council of 27 January 1997 and contains stipulations on the transparency and quality of cross-border payments. With Regulation 2560/2001 the European Parliament extended the coverage of transparency stipulations to the domestic market and required that the same charges apply to both domestic and cross-border euro electronic payment transactions and credit transfers.

With a view to preventing money laundering, the Identification Financial Services Act obliges financial institutions to ascertain the identity of customers wishing to effect certain payments and securities transactions on the basis of an official means of identification. In line with this, the Disclosure of Unusual Transactions Act provides that staff of, for instance, banks must report unusual transactions to a central Disclosures Office; in the context of the introduction of the euro coins and banknotes, the ceiling amounts were adjusted downwards. In addition to these Acts, the Exchange Offices Act requires that exchange offices be registered and that their directors be trustworthy.

A recent development is the so-called "financiële bijsluiter" or financial instruction leaflet that has to accompany complex financial products since 1 July 2002. Its purpose is to increase transparency for the public and to facilitate comparison between financial products.

Legal aspects of securities trading

The securities sector has traditionally been characterised by a high degree of self-regulation. Legislation in the field of securities is aimed at protecting investors and ensuring the adequate operation of the securities market. Three Acts are particularly important in this respect.

The Securities Giro Transfer Act of 1977 provides for the establishment of an institute responsible for the safekeeping, administration and general control of the book-entry securities transfer system. The institute for the book-entry transfer of securities (Necigef) sets up collective deposits in which the owners of securities are entitled to their proportionate share. Necigef determines which securities may enter its book-entry transfer system. Almost all securities listed on the Euronext Amsterdam stock market have been declared book-entry securities and are kept in safe custody by Necigef. The Act has been amended in order to include amongst others registered rights (dematerialised securities) in the book-entry system.

The Act on the Supervision of Securities Trade (Wte) took effect on 15 June 1992. It contains regulations for the supervision of securities business both on and off the exchanges, aimed at promoting the proper functioning of the securities markets and protecting the position of the investor. The Act provides regulations on selling securities, acting as an intermediary or portfolio manager and

organising a stock exchange. Under the Wte, most of the Minister of Finance's responsibilities and powers were delegated to Au-FM. The Wte was an enabling act and contained only framework regulations. Full regulations were laid down in the Decree on the Supervision of Securities Trade and in the Further Regulation on the Supervision of Securities Trade, drafted by Au-FM itself. In 1995, a new version of the Wte came into effect which was designed to bring Dutch legislation into line with the Investment Services Directive (ISD) and Capital Adequacy Directive (CAD) under EU legislation.

On 1 January 1997, the responsibility for supervising the institutions admitted to the stock exchange, at that time Amsterdam Exchanges N.V. (AEX; now Euronext N.V.), was transferred from AEX itself to Au-FM. The Wte 1995 was amended to incorporate this change. As seen above, the sectoral supervisory responsibilities of Au-FM have recently been replaced by a focus on supervision of conduct. Prudential supervision of the admitted institutions is in the hands of the DNB/PVK pair. In addition to its other functions, Au-FM is also responsible for the implementation of the Major Holdings in Listed Companies Disclosure Act 1996; the purpose of this Act is to increase the transparency of markets.

Legal aspects of payment and securities settlement systems

On 1 January 1999 the Finality Act of 17 December 1998, designed to implement the Directive on Settlement Finality (Directive 98/26/EC), came into force. The Act guarantees the final nature of the settlement of transactions in payment and securities settlement systems. To that end, the 1992 Wtk and the Bankruptcy Act were amended. Under the Finality Act, a court decision involving the invocation of the emergency regulation, an adjudication of bankruptcy or suspension of payment in respect of certain parties does not - by contrast with the zero hour clause - affect retroactive payments made by these parties in the designated systems. It ensures the secure functioning of the payment and securities settlement systems. On the basis of a recommendation by the Netherlands Bank, the Minister of Finance has meanwhile designated a number of systems, including TOP, DNB's RTGS, Interpay, the ACH for retail transactions, the AEX Stock and Options Clearings (now Clearnet) and Necigef, the Dutch CSD.

In 1997, when the responsibility for the supervision of institutions admitted to the stock exchange organisation was transferred from AEX to Au-FM, the Minister of Finance subjected the stock exchange's clearing and settlement systems to the Supervisory Framework jointly established by Au-FM and the Netherlands Bank. The Infrastructure Act will be a codification of the Supervisory Framework's standards and procedures for SSSs. The scope of the future Act is broader as it also concerns payment systems.

1.2 The role of the Netherlands Bank

De Nederlandsche Bank N.V. is a private limited company, the shares of which are held by the Dutch Government. The Bank Act, amended in 1998 to accommodate the Maastricht Treaty, ensures that the Netherlands Bank is independent of the Dutch Government. The Bank Act and the Statute of the ESCB stipulate the tasks of the Netherlands Bank in respect of payments.

Pursuant to the 1998 Bank Act and the 1992 Wtk, the Netherlands Bank is responsible for the supervision of banks. Banks wishing to operate as such and to raise funds that can be withdrawn on demand must obtain a licence from the Netherlands Bank and be entered in its register. Institutions wishing to offer solely payment services do not need to be licensed as banks. This exemption does not hold for institutions issuing electronic money.

The 1998 Bank Act states that the Netherlands Bank must ensure the smooth operation of payments. The Bank has a dual role with regard to payment systems: on the one hand, it provides payment services, for example to the local stock exchange, and, on the other hand, it is responsible for the oversight of payment and securities settlement systems. In order to be able to perform these tasks adequately, the Netherlands Bank holds regular consultations with banks and other parties involved in the functioning of these systems.

1.2.1 The operational role

The Netherlands Bank's operational contribution towards the smooth and efficient settlement of economic transactions takes the form of services relating to cash payments, non-cash payments and securities transactions.

Services in respect of cash payments

The 1998 Bank Act states that one of the Netherlands Bank's tasks is "to provide for the circulation of money as far as this consists of banknotes". This provision is in line with the Statute of the ESCB, which states that the Governing Council of the ECB may authorise the ECB and the NCBs to issue banknotes within EMU. The Netherlands Bank performs the following tasks in respect of the circulation of money:

- developing and ensuring the production of euro banknotes within the framework of the ESCB;
- distributing banknotes; and
- verifying and inspecting the banknotes in circulation.

Banknotes are distributed through the Netherlands Bank's four agencies. Every day, the banks withdraw large quantities of money to provide their customers with ready cash. Banknotes are distributed via ATMs and banks' offices (including the post offices). Excess banknotes flow back to the banks, which usually process them in cash centres, after which they are returned to the Netherlands Bank. The latter then checks the banknotes for counterfeits and inspects the quality of the notes; unfit notes are replaced while others are put back into circulation.

While the Netherlands Bank is responsible for banknote issuance, the Ministry of Finance is responsible for minting and issuing coins. The Coinage Act stipulates the manner in which this is to be done. The Bank gives advice on the number of coins to be minted annually. By virtue of a Royal Decree, the Netherlands Bank is responsible for the distribution of coins. The Bank has organised the distribution of coins in line with the distribution of banknotes, and is considering outsourcing this part of its activities.

Services in respect of non-cash payments

The Netherlands Bank performs an operational role in the processing of non-cash interbank payments. Its system is used to settle the payments of institutions that have an account at the Netherlands Bank.

Most domestic banks are linked to the Netherlands Bank's gross settlement system, TOP. In 2001, these banks effected on average 16,000 transactions per working day, with an average daily value of EUR 85 billion. These are large interbank payments arising from domestic money market and securities transactions and cross-border interbank payments carried out via TARGET. Cross-border payments accounted for 13.1% of the total number of transactions and 56.0% of the total value of transactions processed in TOP.

The banks also settle their retail payments via TOP. These are net amounts arising from the daily clearing carried out by Interpay, the Dutch net clearing and settlement system for low-value payments. In 2001, an average of 10 million transactions were conducted per working day, with a relatively low total daily value of less than EUR 7 billion. The Netherlands Bank itself is not involved in the processing of individual low-value payments, but it does oversee the development of processing systems. Section 3 examines the operational side of payment systems in greater detail.

Services in respect of securities transactions

The Netherlands Bank plays a major operational role in the settlement of high-value securities transactions. In respect of securities transactions not performed via the stock exchange, it provides DVP services for banks; in 2001, these accounted for about 36% of all transactions in TOP. In addition, the Netherlands Bank is the settlement bank for Clearnet Amsterdam. Furthermore, it manages the collateral for the clearing members.

1.2.2 The role of the Netherlands Bank as overseer

The Netherlands Bank performs the task of overseer. Oversight addresses the security, reliability, continuity and efficiency of SSSs, payment systems and payment instruments. The main objective of oversight is to prevent systemic risk. This applies in particular to the oversight of securities settlement and payment systems. With regard to payment products, the aim is mainly to protect consumers.

Concerning the practical aspects of oversight, a distinction is made between:

- evaluating the setup of the assessment frameworks for the management of risks inherent in SSSs, payment systems and payment instruments; and
- testing the systems' operating procedures.

Oversight of payment systems is the exclusive responsibility of the Netherlands Bank. It therefore entails both evaluating the setup of the assessment frameworks and testing the method of operation of Interpay's system for low-value payments and of the Netherlands Bank's own large-value payment system, TOP. The in-house payment systems of banks are basically subject to the supervision exercised pursuant to the Wtk. The internal auditing department plays a major role in the daily assessment of TOP. The Netherlands Bank's external auditor also assesses the system in terms of existing standards.

In order to achieve clarity and to make a distinction between oversight and supervision pursuant to the Wtk, the Netherlands Bank has set up a separate unit responsible for oversight. This unit examines and analyses the risks inherent in (new) SSSs, payment systems and payment instruments and makes recommendations on how they should be managed.

The oversight of SSSs is a shared responsibility. Assessing the method of operation falls within the remit of Au-FM, while evaluating the setup of and changes in the assessment frameworks for SSSs is the joint responsibility of Au-FM and the Netherlands Bank. To this end, the latter drew up an outline of the assessment framework on the basis of the Lamfalussy standards. At the end of 2000, the evaluations of the assessment frameworks for the existing Dutch SSSs were completed. The merger of the Paris Bourse, the AEX and the BXS has an impact on the practical aspects of oversight in an international context.

In order to facilitate international cooperation in the oversight of Euronext's clearing activities, a Memorandum of Understanding (MoU) on clearing was concluded in early February 2001 between the Dutch, French and Belgian supervisors and overseers involved. It is based on principles such as cooperation on equal terms and mutual acknowledgment of national jurisdictions. With a view to coordinated supervision and oversight a Co-ordination Committee on Clearing was set up, on which all banking supervisors, securities regulators and overseers have a seat. This committee, in which the Bank participates, discusses planned systems changes and coordinates oversight measures to be taken.

As Euronext stock exchange transactions are settled via Euroclear Bank in Belgium, cooperation in respect of settlement is also required. In early 2002 cooperation between the Dutch, French and Belgian supervisors and overseers was laid down in an MoU. In this MoU on settlement, the Belgian supervisors and overseers have been recognised as lead supervisory authorities. A settlement committee was established with representatives of the Belgian, French and Dutch authorities charged with the supervision and oversight of Euronext's settlement activities. The settlement committee will discuss all the settlement issues relevant for Euronext. The committee has an advisory function; the Belgian supervisors will implement its recommendations to the best of their ability.

The following table gives an overview of the systems subject to oversight and the institutions responsible for such oversight.

Payment and securities settlement systems and overseers

	Assessment of setup	Assessment of operation
Payment systems		
Interpay	DNB	DNB
TOP/TARGET	DNB	DNB
SSSs		
Euronext Amsterdam Stock Clearing	Au-FM/DNB	Au-FM
Euronext Amsterdam Derivatives Clearing	Au-FM/DNB	Au-FM
NIEC	Au-FM/DNB	Au-FM
Necigef	Au-FM/DNB	Au-FM
NLKKAS (Euronext Amsterdam Commodity Clearing)	Au-FM/DNB	Au-FM

1.2.3 Cooperation with other institutions

At the national level, the Netherlands Bank and commercial banks have set up a consultative structure in order to exchange views about policy objectives formulated by national and international authorities and to communicate their own policy aims.

At the level of the Boards of Management, the Steering Group on the implications of EMU was set up in 1994 to discuss the consequences of the euro for the Dutch banking system. This Steering Group's task was later extended. For instance, it provided guidance on the preparation of the banks' automated systems for Y2K and, in early 2000, it was transformed into a general consultative forum, the Payments and Securities Settlements Policy Forum (*Beleidsoverleg Betalingsverkeer en Effectenafwikkeling*, BBE) comprising the Netherlands Bank and the banking system. The Netherlands Bank chairs the forum, while the Netherlands Bankers' Association (NVB) acts as its secretariat.

Under this Policy Forum, the Working Group on Payments and Securities Settlement serves as a forum for consultations between the Netherlands Bank and the Dutch banking and securities sectors. The aim is to achieve a structured exchange of information on major issues relating to payments and securities transactions. The Working Group reports to the Policy Forum and is made up of representatives of the Netherlands Bank, the commercial banks, the stock exchange (ad hoc) and Interpay. The Netherlands Bank holds the chair, while the NVB acts as the secretariat.

At the European level, numerous ESCB working groups are active in the field of payment systems. Cooperation in the field of securities also takes place in the framework of the ESCB-CESR (Committee of European Securities Regulators) working group. At the broader international level, the main forum is the Committee on Payment and Settlement Systems, of which the Netherlands Bank's Executive Director responsible for payments is a member.

1.3 The role of other private and public sector bodies

An overview of the other important private and public players in the payments and securities sectors can be found in the subsections below.

1.3.1 Bodies in the payment sector

Netherlands Bankers' Association

The Netherlands Bankers' Association (NVB) is the most important interbank consultative body in the banking sector. Its objective is to serve the interests of banks in a general sense. Nearly all banks registered in the Netherlands are members of the NVB. The interbank consultative body has a

relatively simple structure, with policy committees, committees and working groups advising the Association's Executive Committee.

The NVB's Policy Committee on payments is the main consultative body in respect of payment systems. It is made up of those members of the Boards of Management of the various banks who are in charge of payment systems. This Committee is concerned with general policy frameworks and joint infrastructures, as well as retail and wholesale products. An Advisory Committee on payments consisting of the banks' senior payments managers supports the Policy Committee. This Committee heads a number of working groups covering a variety of aspects relating to payment systems.

Interpay Nederland B.V.

Interpay Nederland B.V. is the central clearing institute for retail payments set up by the banks with a view to promoting and maintaining efficient payment processing and reliable payment systems. Interpay runs the network of POS terminals and the interbank authorisation network for cash dispenser transactions, issues credit cards and provides image-processing services to individual banks. The banks are both its shareholders and customers.

Consultations are held within the Advisory Board, made up of the members of the NVB's Advisory Committee on payments.

Social Forum on the Payment System

The Social Forum on the Payment System (*Maatschappelijk Overleg Betalingsverkeer*, MOB), which replaces the former Working Group on the Efficiency of Payments, is made up of senior officials of the representative organisations of suppliers (banks) and users (consumers and businesses) of payment systems, as well as of governing and public bodies. The aim is to contribute to an efficient organisation of the Dutch payment system by exchanging information on practical bottlenecks and policy issues, and by striving for joint agreements on efficiency measures. The Forum does not have regulatory competencies. The Bank chairs the Forum and performs secretariat functions.

1.3.2 Bodies in the securities sector

Euronext N.V.

On 22 September 2000, the AEX, the Bourse de Paris and the BXS officially merged to form Euronext, establishing the first fully integrated cross-border single currency stock, derivatives and commodities market. Euronext is a holding company with the three stock exchanges working as operating companies with their registered offices in Amsterdam. Being established as a Dutch company, Euronext has a two-tier board structure, as required under Dutch company law (called *structuurregime*). Euronext Amsterdam N.V. is a wholly owned subsidiary of Euronext N.V. and is responsible for the organisation of the Dutch stock exchange, derivatives markets and commodities markets.

Authority for the Financial Markets

The predecessor of the Authority for the Financial Markets (Au-FM), the Securities Board of the Netherlands (STE), was established in 1988, following a decision to entrust the supervision of securities business, both on and off the stock exchange, to an independent organisation, removed from both government and the securities sector itself. The STE's mandate was to ensure the proper functioning of the securities markets, to increase the transparency thereof and to protect the position of investors. On 1 February 1989, the STE was entrusted by the Minister of Finance with the supervision of the Dutch stock exchange, reporting to the Minister. As from 1 March 2002, the STE became Au-FM in the framework of the reorganisation of supervision from a sectoral to a functional model. At the national level, Au-FM is responsible for the supervision of conduct and works together with the two other supervisors entrusted with prudential supervision, the Netherlands Bank and the Pension and Insurance Board (PVK). At the international level, Au-FM is the Dutch representative at the International Organization of Securities Commissions (IOSCO) and the CESR (Committee of European Securities Regulators).

Dutch Securities Institute

The Dutch Securities Institute (DSI) was established to foster the confidence of investors in the securities sector by promoting the quality and integrity of the people employed, in particular traders, investment consultants, portfolio managers and investment analysts. To this end, it keeps four public registers, maintains a Code of Conduct and has set up a Complaints Committee.

Necigef

Pursuant to the Securities Transfer Act, Necigef is responsible for book-entry transactions, as well as the custody, management and administration of securities on behalf of the participants. Necigef is a wholly owned subsidiary of Euronext Amsterdam N.V.

The management of securities which do not fall within the scope of the securities Giro Transfer Act, such as dematerialised bonds, may be carried out by the Dutch Interprofessional Securities Centre (NIEC).

Association of Stockholders

The Association of Stockholders (VEB), founded in 1924, aims to promote the interests of stockholders and stockholding in general.

2. Payment media used by non-banks

2.1 Cash payments

Banknotes and coins are the media used for cash payments. Both are legal tender, although the acceptance of coins by the public is compulsory only up to certain maximum amounts. Under the terms of the Coinage Act 1948, the Royal Mint, an institution supervised by the Ministry of Finance, produces coins. In accordance with Article 105a of the Treaty establishing the European Community, "the ECB has the exclusive right to authorise the issue of banknotes. The ECB and the national central banks may issue such notes". With reference to the Treaty, the Bank Act 1998 stipulates that the Netherlands Bank has the sole right to issue banknotes in the Netherlands.

At the end of 2001, the currency in circulation consisted of six denominations of banknotes (NLG 1,000, 250, 100, 50, 25 and 10) and eight denominations of coins (NLG 50, 10, 5, 2.50, 1, 0.25, 0.10 and 0.05).¹ The currency in circulation amounted to EUR 11.3 billion, against EUR 18.7 billion a year earlier, the decrease being due to the changeover to the euro notes and coins. Of this total, EUR 10.4 billion was accounted for by banknotes, against EUR 17.4 billion in 2000. At the end of 2001, banknotes constituted 6.5% of the narrow money supply M1 and 2.6% of the broader money supply M3, against double these figures a year earlier. In the early months of 2002 a relatively large amount of euro notes and coins were brought into circulation, so as to ease the changeover. By April 2002, banknotes constituted more than 7.5% of M1 and nearly 3% of M2.

No exact figures are available for the number of cash payments. As a rough estimate, around 70% of the total volume of commercial transactions are effected in cash. Apart from everyday expenses, cash is also used in specific markets such as the used car market, as well as when tax evasion plays a role. The total volume of cash payments in 2001 was estimated at 7.1 billion, while the value of cash payments was estimated to be EUR 70 billion. However, the larger the value of the payment, the greater the tendency to pay by cashless means using deposit money.

¹ In the early months of 2002, these were replaced by seven denominations of euro notes (EUR 5, 10, 20, 50, 100, 200 and 500) and eight denominations of euro coins (EUR 0.01, 0.02, 0.05, 0.10, 0.20, 0.50, 1.00 and 2.00).

2.2 Non-cash payments

Non-cash payments are made by transferring money deposited on a sight account, to which the account holder has direct access, by ordering the bank to withdraw or transfer the desired amount. Most households and businesses hold one or more accounts. At the end of 2001, they held about 22.5 million accounts, of which around 1.5 million were corporate accounts. Nearly all transactions in trade and industry are settled by cashless payments.

At the end of 2001, 93.5% of the narrow money supply M1 was held in the form of sight deposits with banks. About 3.8 billion cashless payments were made that year for a total value of around EUR 3,500 billion. In order to transfer deposit money Dutch banks offer similar payment instruments, such as credit transfers, direct debits and payment cards. Banks also offer payment services that are not related to sight accounts, such as traveller's cheques and money orders. The value and volume of these services is relatively limited.

2.2.1 Credit transfers

Practically all non-recurrent payments in trade and industry, as well as some household payments, are effected by means of ordinary credit transfers. This payment instrument, which has been standardised between banks, is also used by the central government and local authorities. When used by households, most of the original ordinary credit transfer instructions are still sent in paper form. However, a growing number of account holders use data communication lines to deliver payment orders to their bank, either via a computer (electronic banking) or by telephone (telephone banking). Corporate customers and government institutions mostly use non-paper-based, electronically readable methods of payment. Bulk payment orders are usually delivered via data communication lines. A declining number of corporate orders are still delivered on magnetic tapes.

In order to make processing more efficient, Dutch banks offer two types of pre-prepared credit transfers: the standing order and the "inpayment transfer" or "accept giro". In order to pay recurrent bills, an account holder may choose to set up a standing order with the bank, on fixed dates, for fixed amounts and for a named account. This non-paper-based method of payment is frequently used for rent, subscriptions, insurance premiums, etc. On the fixed date, the bank effects the transfer and no further action on the part of either the account holder or the payee is required.

When using an accept giro, the payee takes the initiative by sending a fully prepared transfer form together with the bill. In most cases the payer's account number, name and address are already printed on the form, as they are already known from previous payments. All the payer has to do is sign the form and send it to its bank. This payment instrument is used for both regular and non-recurrent payments of either fixed or varying amounts, eg insurance premiums, subscriptions or bills for deliveries to regular customers.

This pre-prepared transfer is a paper-based instrument which is mainly processed by means of image-processing technology to convert the relevant payment data into digital information. However, a growing amount of accept giro information is reaching banks in digital form, as account holders use electronic banking software packages to deliver their payment orders. In this case, account holders take care of the conversion of the relevant data. Banks are looking into a digital version of this pre-prepared transfer by using internet sites to send bills and accept giros (electronic billing).

Giro payments are prominent in the Netherlands, as 38% of the total volume and over 90% of the total value of retail payments are made by credit transfer. Credit transfers are often used for business-to-business payments. The average amount of a payment by credit transfer is over EUR 1,700.

2.2.2 Direct debits

Direct debits constitute a separate category of instruments for collecting payments. The payer signs a mandate authorising the payee to charge the former's account for goods delivered or services rendered. The transfer is initiated by the payee, who sends the payment order in electronic form (via data communication lines or on magnetic tape) to the bank with instructions to collect the money due by debiting the debtor's account in favour of its own account. The payers, however, remain in charge of their accounts, maintaining the opportunity to make use of a payback guarantee at their banks until a certain point in time.

Direct debits are frequently used for collecting recurrent payments, such as payments to public utilities and telephone companies. The electronic form and the short processing route make the direct debit a

very efficient means of collecting payments. Dutch banks offer several types of direct debits in order to meet the specific needs of different types of payment, such as the purchase of lottery tickets (without a payback guarantee) and mail order services.

In 2001, 27% of all retail payments were made by means of direct debits. The average amount paid using direct debits is around EUR 230.

2.2.3 Payment cards

Payment cards are plastic cards with several functions used to initiate payments at the point of sale or to make withdrawals from an account. For the issuer, the most important function is the authentication of the account holder by checking a signature or a PIN.

Since around 1995 the use of debit cards with PIN authentication for daily retail payments has grown enormously, partly replacing cash and completely replacing the use of guaranteed cheques. At the end of 2001, the total number of payment cards in issue was 27.2 million, consisting of 4.7 million credit cards and 22.5 million debit cards. Most debit cards are equipped with an electronic purse function.

The following types of payment cards are in circulation: debit cards, credit cards, retailer cards and prepaid cards (single purpose and multipurpose).

Debit cards

Debit cards are cards with direct electronic access to a bank account with the use of a PIN. The majority of debit cards are equipped with a magnetic stripe as well as a microchip. Three types of debit functions can be distinguished: withdrawal, payment and mere identification in the context of payments.

Debit cards are used to make withdrawals, either in cash at an ATM or in electronic money by loading an electronic purse. In 2001 over 90% of all cash withdrawals were made at ATMs, accounting for 470 million transactions. The average amount withdrawn increased to EUR 84 per transaction. All 7,142 ATMs in the Netherlands are interoperable and are connected to the international ATM network. For security purposes, use of another bank's ATM is subject to a daily limit in terms of both the number of withdrawals and the amount withdrawn.

Debit cards are used mostly at EFTPOS terminals in shops, restaurants and hotels, etc. In the mid-1990s, the number of POSs grew enormously, as did the volume and value of the transactions. In 2001, the total volume of EFTPOS transactions exceeded 950 million, accounting for a total value of EUR 42 billion, which amounts to 30.6% of the total volume but only 2% of the total value of cashless payments. At the end of 2001, 165,000 EFTPOS terminals were in operation. The availability and reliability of the network exceeded the minimum standard of 99.98%.

Debit cards are also used for identification in the context of payments. Traditionally, the signature on the card was used for identification in conjunction with the use of guaranteed cheques. Cards are increasingly being used as an electronic identification device to authorise credit transfers (remote payments) made by telephone or to authorise payments over the internet.

Credit cards

The volume of credit cards in circulation increased considerably from 420,000 in 1988 to over 4.7 million in 2001. The number of credit card transactions at the point of sale is still modest: just over 1.6% of non-cash payments are made by credit card. Since most Dutch banks issue MasterCard, this brand is most often used. Despite the fact that most banks do not issue Visa, the number of Visa cards issued is high owing to a co-branding strategy with non-financial institutions (insurers, automobile associations, etc.). Some retail chains actively promote their own retailer cards (private label cards), but from a payments point of view their role is insignificant compared with the use of payment cards and cash.

Prepaid cards

A prepaid card is a payment card which contains purchasing power that is paid for in advance. The most widespread prepaid card is the single purpose telephone card, which enables national and

international telephone calls to be made from pay phones. The use of these cards is declining owing to the spectacular growth in the use of mobile phones and of multipurpose electronic purses.

At mid-2002, around 16 million cards were equipped with an electronic purse, the "chipknip", that can be loaded at 4,258 loading devices and used for payments at about 160,000 EFTPOS terminals. The infrastructure seems ready for mass use. After a few years of sluggish growth, in 2002 the use of electronic purses seems to have taken off, with an estimated 80 million transactions, two and a half times as many as in 2001. For consumers, the added value of the purses is most likely to be generated by replacing small-value cash payments and the use of coins. It is not surprising then that two thirds of all transactions are payments for parking, catering and purchases from vending machines. The growth in the use of the purse can be explained by the introduction of euro coins and notes and by the fact that three major cities have made electronic parking payments compulsory. For visitors without a reloadable chipknip, a multipurpose stored value card has been issued, which can be bought in these cities.

Moreover, banks are investing in applications to use the chipcard technology for identification purposes in telephone banking and internet banking.

2.2.4 Cheques

Given that a satisfactory giro transfer system has been available to the public from a very early stage, non-guaranteed cheques have never played a significant role as a general payment instrument in the Netherlands. In the second half of the 1960s, following the large-scale introduction of sight accounts for the public, the guaranteed cheque was introduced together with a cheque guarantee card showing the cardholder's account number and signature. For point of sale payments, it served as one of the main non-cash instruments in the period between 1970 and 1990. In the 1990s, the number of cheque payments declined substantially, reflecting their replacement by EFTPOS payments. Given the decline in the use of cheques, as well as the high processing costs, Dutch banks stopped issuing cheques in July 2001 and terminated processing by the end of that year.

2.3 Recent developments

New distribution channels for payment services

Many corporate and private bank customers use electronic banking systems to send credit transfers and to receive account information. In 2001 over 2 million households, one third of all households, used electronic banking for sending payment instructions to their bank. The next step in the evolution of electronic banking involves further adaptation for internet use. Internet banking enables account holders to access their accounts from any location in the world. Security is guaranteed using hard tokens (calculators or the already widespread chipcards). More and more Dutch consumers choose internet banking to communicate with their banks; there were about 1 million users in 2001.

In a similar way, banks provide automated banking services via telephone, particularly for their private customers. With such services, customers can access information on their accounts, transfer money to and from their own savings and investment accounts and send credit transfers to third-party accounts.

The second step in the development of telephone banking involves the use of mobile phones for banking and internet services. If a mobile phone is equipped with a secure chipcard, it becomes a small terminal with many possible applications, such as making financial transactions. The new generation of mobile telephones will give rise to the development of a wide range of new services, including WAP-based secure payment services. In 2001 a large retail bank launched a WAP-based mobile banking project in cooperation with a service provider; over 0.5 million consumers now use their mobile phone for sending payment instructions and receiving information from the bank.

Since internet retailers are faced with many different means of payment, companies have been established which specialise in back office payment processing. These new "payment intermediaries" take care of the administration and settlement of all incoming internet payments, no matter what kind of payment instrument or method is used. Some banks offer the same kind of services, increasing the competition between banks and non-banks, such as consulting agencies and telephone companies.

3. Interbank exchange and settlement systems

3.1 General overview

Cashless payments are processed in two interconnected payment systems:

- the TOP system of the Netherlands Bank; and
- the automated clearing house for retail transactions (Interpay).

3.2 The real-time gross settlement system: TOP

TOP, the real-time gross settlement system of the Netherlands Bank, has been designed for processing and settling large-value payments in euros. TOP is not an acronym. Rather, the system is named after the market sector in which it operates: the “top”, ie the sector handling the largest-value payments in the Netherlands.

The total transaction volume in TOP in 2001 was 4.2 million, with a total value of EUR 21,500 billion. The average value per transaction amounted to EUR 5.1 million.

3.2.1 General overview

The Netherlands Bank offers current account facilities to banks and to the government, allowing banks to fulfil their reserve requirements on these accounts and permitting the settlement of payment transactions on its books. Although TOP is, in principle, intended to handle large-value interbank payments, there are in fact no upper or lower value bounds. This also applies to cross-border payments through TARGET.

The TOP system only handles credit transfers on a gross basis, which means that payments are settled immediately and irrevocably, provided that the paying bank has a credit balance on its current account or enough unused collateral to make a secured overdraft. In the event of inadequate cover for a debit transaction, the payment order cannot be processed. For this purpose, a queuing mechanism has been developed.

TOP processes different types of transactions. First, there are the purely domestic transactions, such as normal interbank transfers, securities transactions, net settlement transactions and cash cover transactions. In 2001, the share of these domestic transactions was 54.6% of the total volume and 39.1% of the total value processed by the system.

The second category relates to “8007” transactions, which are domestic interbank transactions where at least one non-resident account holder is involved and where balance of payments reporting obligations must be fulfilled. These transactions constituted 33.2% of the total volume processed in 2001 and 5.9% of that year’s total value.

Third, there are the pure cross-border payments through TARGET, with a 12.2% share in total volume and a 55.0% share in total value in 2001.

TOP makes it possible to assign up to three different priorities to a payment order: priority 2 for urgent payments, priority 3 for normal payments and priority 9 for non-urgent payments. The latter are not processed immediately. High priority payment orders must be processed as quickly as possible. To this end, part of the balance may be reserved for such orders. Participants cannot assign priority 1, which is the highest priority determined by the Netherlands Bank and is reserved for, amongst other things, the settlement of ancillary systems.

3.2.2 Participants in the system

The access criteria for participants in TOP are set by the ESCB in respect of the participation of credit institutions in the TARGET system. Within this framework, the Netherlands Bank has set the following access criteria for participation in TOP:

- financial departments of central or regional governments of EU member states which are active in the money market;

- institutions forming part of the government sector, as referred to in Article 3 of Council Regulation (EC) 3603/93, which have been authorised to hold accounts for customers;
- supervised credit institutions as referred to in Article 1, first indent, of Directive 77/780/EEC which are established in the EEA;
- supervised investment firms as referred to in Article 1.2 of Directive 93/22/EEC which are established in the EEA; and
- supervised providers of clearing and settlement services.

In addition to domestic central governmental institutions, all authorised credit institutions are eligible to participate, including Dutch-based subsidiaries of foreign banks and branches of foreign banks to which the Second Banking Co-ordination Directive of the European Community is applicable. The same holds for supervised non-bank financial intermediaries such as payments and securities clearing institutions, but they have limited use of the system and do not have access to the credit facilities. The rules are identical for all participants. Each participant subject to reserve requirements normally holds one reserve account, which may also be used for payment purposes. Besides the above-mentioned institutions, the Bank offers accounts to other NCBs and some international financial institutions (IFIs). IFIs do not have direct access to the system, but use the central bank as their correspondent.

3.2.3 Types of transactions handled

As mentioned above, TOP processes both domestic and cross-border transactions. The most commonly used types of transactions are briefly discussed below. In TOP, each transaction type is designated by a letter code.

FA transactions

An FA transaction is a standard transaction for domestic interbank payments, eg call loans. FA transactions can be entered by each participant in respect of accounts for which the participant is entitled to authorise debit transactions. When entering the payment order, the account holder indicates the desired priority. In the case of a standard FA transaction, the priority will usually be 2 or 3. Within TOP, FA transactions may be scheduled. Scheduling means that the payer assigns a future value date to the payment order. TOP records the transaction and queues it for processing on that future date. Scheduled transactions may be withdrawn; for this reason, until the value date, the payee cannot obtain information on scheduled credit transactions to its account.

Cash cover transactions

A cash cover transaction (CH) is used for the acquisition of banknotes and coins, which are subsequently transported by cash-in-transit companies from the offices of the Netherlands Bank to participants. Participants authorised to make such withdrawals enter a cash cover transaction debiting their own account and crediting the DNB office concerned, before the withdrawal takes place.

A cash cover transaction is an irrevocable payment order which reserves account cover for a future value date. It can be assigned priority 2 or 3. The transaction is settled on the value date. If account cover is insufficient, the order is queued. If no account cover has been reserved at the closing time for such transactions, the transaction is cancelled.

Trade-for-Trade transactions

Trade-for-Trade (TfT) transactions concern the gross settlement of over-the counter (OTC) securities transactions in the wholesale sector of the Euronext Amsterdam Stock Exchange. During the day, the Dutch securities settlement institute, Necigef, sends batches of payment instructions arising from securities transactions to TOP. The batches are sent through SWIFT. The payment orders are settled individually in real time.

Net settlement transactions for ancillary systems

The TOP system is used for the settlement of retail payments, cleared by Interpay, and for the settlement of securities and derivatives transactions, cleared by Clearnet. These are divided into five types of transactions: the debit (DL) and credit lots (CL) made of the bulk retail payments processed by Interpay, the bulk securities payments sent by the Euronext Amsterdam Stock Clearing (CV), the

bulk payments by the Euronext Derivatives Clearing (OV) and the urgent payments from Interpay's special Telegiro circuit (TV, see Section 3.3).

With the "lot settlement procedure", multiple net settlement was introduced on 1 October 2001; the daily stream of transfers processed by Interpay is split into "lots" (DL and CL). Instead of once a day, as is still the case for the settlement of the other ancillary systems, net settlement of retail payments takes place around every 30 minutes. This procedure is further described in Section 3.3.

Net settlement transactions are handled in TOP as a "unit of work". Settlement is effected as soon as the appropriate proportion of account cover has been reserved for all accounts to be debited. Net settlements are automatically assigned priority 1 and cannot be scheduled.

8007 transactions

An 8007 transaction (DP) is a payment order involving a cross-border payment where at least one non-resident account holder is involved. "8007" refers to the code under which these transactions must be reported to the Netherlands Bank for the compilation of the balance of payments. These transactions do not affect the balance of payments as such, because they only refer to the domestic transaction between the domestic party's bank and the correspondent bank of the foreign party.

Cross-border transactions

In TOP, there are two types of cross-border transactions conducted through TARGET: Interlinking customer payments (IC) and Interlinking interbank payments (IB).

Cross-border payments to countries which are not operating on the day in question are rejected by TOP. Cross-border payments to countries which have not yet opened for operations but will be operating on the day in question are accepted by the system.

In the Netherlands, cross-border TARGET payment orders can be sent to TOP through the SWIFT network. Provided that the payer's account cover is sufficient, TOP converts the cross-border payment order into an interlinking message and reserves the required proportion of the payer's account cover. The interlinking message is sent to the NCB of the country where the payee holds an account. This NCB credits the payee's account and notifies the Netherlands Bank. TOP then lifts the cover reservation and debits the payer's account, sending the payer a debit note. The debit note is sent via SWIFT. The few banks that do not have access to the SWIFT network may send their orders on tape or on paper. DNB sends them paper-based debit notes.

3.2.4 Operation of the transfer system

TOP is in operation from 7 am to 6 pm for the receipt of payment orders requiring same-day settlement. The closing time for customer payments, however, is 5 pm. Within these operating hours, allowance must be made for interbank deadlines for certain transaction types and TARGET deadlines for customer payments. TOP's opening hours have been brought into line with TARGET's opening times and calendar of operating days.

When TOP closes, the Payments Supervisor starts the end-of-day process, which is meant, among other things, to reveal whether all queues are empty. If they are not, the Payments Supervisor will, in consultation with the parties involved, take appropriate action (ranging from a request to replenish an account balance to the cancellation of transactions). If all queues are empty, the value date is closed by preparing and transmitting the "statement of account", the "end-of-value date survey" and the "daily 8007 external payments report".

3.2.5 Transaction processing environment

Participants communicate with the TOP system through the SWIFT network and through TOPView.

At the end of 2000, TOP expanded its capacity to send and receive messages via SWIFT and formed a "Closed User Group" in order to serve all participants. TOP has been recognised as a "Market Infrastructure" within SWIFT, meaning a higher service level provided by SWIFT and high priority during recovery. SWIFT has become the primary channel for payment-related communication for TOP participants. Because the SWIFT network allows for straight through processing (STP) and had to be used for cross-border transactions through TARGET, banks increasingly used it to deliver domestic

payment orders in TOP as well, making the TES workstations that were formerly used to communicate with TOP redundant. In the second half of 2001, the TES were discontinued.

TOPView was introduced by the Netherlands Bank in the spring of 2001. TOPView offers secured browser-based access to payment information such as waiting queues and account balances. Customers in a Windows environment are connected to a virtual private network (a secured network over the internet). Authentication is effected by means of a digital certificate on a chipcard. This communication channel cannot be used for credit advices or transfer orders, but banks can rearrange their queues, change the prioritisation of their payments or cancel payments for future value dates. With the latest release, in May 2002, banks can have an overview of their payments in TOP of the last five working days.

3.2.6 Settlement procedures

During opening hours, TOP settles payments irrevocably and with immediate finality upon receipt. As soon as the account cover is sufficient, TOP ascertains whether one or more items from the queue can be processed. In addition, batch items (8007) with the same priority are sorted in ascending order of value. This enables all items to be processed as quickly as possible. Following settlement, debit and credit notifications are sent to the account holders concerned.

If account cover is not sufficient, payments are queued. Orders are arranged within the queue on the basis of their priority and, within each priority class, on the basis of the time of receipt. The order of transactions within the queue also governs the order of processing: transactions in the same priority class are handled on a FIFO basis. As soon as a credit transaction is effected, TOP once again checks whether transactions from the queue can be processed.

The order of queued items can be influenced by means of "pointing". A payment order may be pointed forward, that is, towards the head of the queue, immediately before orders with priority 2. Orders with priority 1 always remain at the head of the queue. An order may also be pointed backwards, that is, towards the rear of the queue, immediately after orders with priority 3. Furthermore, participants are allowed to change the order of queued transactions within the same priority class.

A queued transaction cannot be revoked. Queued transactions can only be cancelled by the Payments Supervisor of the Netherlands Bank in consultation with all parties involved.

3.2.7 Credit and liquidity risks and their management

TOP only settles transactions subject to sufficient cover, permitting only secured (collateralised) overdrafts, which significantly reduces liquidity and credit risks.

3.2.8 Pricing policies

As a principle, the Netherlands Bank recovers its costs. It charges each account holder an annual fee of EUR 725. In addition, transaction fees are charged according to the medium used and the monthly number of transactions. Cross-border transactions through TARGET are subject to the ESCB pricing structure.

3.2.9 Main projects and policies being implemented

Since the introduction of TOPView, participants in TOP have to use two different communication channels for transferring orders (SWIFT) and for accessing payment-related information (TOPView). There are plans for TOP to migrate to SWIFTNet at some point in time; participants will then be able to exchange information and to send transfer orders based on internet protocols.

After the successful introduction of the so-called "lot settlement procedure", which increased the settlement frequency of the cleared retail transactions, the Netherlands Bank and Interpay are envisaging modifying the settlement procedure of urgent "Telegiro" retail payments. These payments are very fast and settlement is guaranteed by a separate collateralised credit facility at the Netherlands Bank. The end-of-day net positions are finally settled at the Bank. Telegiro transactions could be settled directly in TOP, in order to improve efficiency, from a liquidity management point of view, by uniting the two separate credit facilities.

3.3 The retail payment system: Interpay

In order to facilitate the collection and processing of retail transfers between their customers, the Dutch banks, with the exception of the Postbank, formed a common clearing house in 1967, which is now called Interpay. This circuit currently consists of about 70 banks, where altogether about 15.2 million accounts are held. Interpay's shares are in hands of nine banks. Interpay is organised in two divisions: Giro Services, which is responsible for the clearing and settlement-related operations, and Acquiring Services, which runs the authorisation network for card transactions.

It should be noted that, apart from the clearing, which takes place through the facilities provided by Interpay, a considerable amount of retail transactions are processed at the large banks themselves, using in-house processing facilities. Since the banking sector is highly concentrated, a large number of payments are for transfers between customers of the same bank. A large proportion of these payments do not reach the clearing house, but are transmitted to the individual banks' processing centres.

Interpay not only acts as the automated clearing house for interbank payments, but also as the central routing switch for all EFTPOS transactions and ATM transactions involving customers of other banks, and as a subcontractor for parts of the Eurocard issuing and transaction authorisation process. Additionally, Interpay performs image-processing services for some banks.

The Interpay clearing house system is fully automated. The number of transactions processed in 2001 was 2,558.3 million, with a total turnover of EUR 1,574.1 billion.

3.3.1 General overview

Banks participating in the ACH have a common account numbering system, which allows for an automated number check. Account numbers, as well as names and addresses of account holders of the participating banks, are administered centrally by Interpay.

Interpay acts as an intermediary between the participating banks. It receives transfer orders and converts them automatically into debit and credit items for individual banks and individual account numbers. The transfer orders can be sent in by individual banks or by large companies. Interpay collects the entry data for all financial transactions and transfers these data to the bank. In some cases, Interpay passes the payment details straight on to the customers of the bank.

The technical operations by Interpay are followed by financial settlement. The participating banks have authorised Interpay to manage the daily settlement process at the Netherlands Bank on their behalf; the account of each bank is debited or credited by the difference between the total debit and credit items.

Interpay does not have a financial relationship with bank customers. The individual bank itself makes the actual debit and credit entries in the accounts and produces and sends the statements of account, using automated processes.

3.3.2 Participation in the system

Almost all deposit-taking banks participate in the system. The Netherlands Bank is not a participant, although it uses some of the Interpay services.

3.3.3 Types of transaction handled

Interpay handles all types of retail transactions: mass regular disbursements by firms such as the payment of salaries, express payments, regular payments by consumers such as the payment of utility bills by means of "accept giros" (inpayment transfers) and direct debits, and all kinds of retail transactions using debit and credit cards as well as electronic purses.

3.3.4 Operation of the system

The system is a net settlement system. In fact, it comprises two systems: the Clearing and Settlement System (CSS) for bulk payments and the Telegiro circuit for urgent payments.

The Telegiro circuit was created for urgent payments between banks and between their customers. This service includes very fast (ie within a few minutes) and guaranteed settlement and notification to

the beneficiary of the irrevocable settlement. It is often used for paying relatively large amounts, for example in real estate transactions. The guarantee does not involve any risk, because the system is based on a collateralised credit facility, which is separated on a daily basis from the facility that participating banks have at the Netherlands Bank. The formal settlement of these secured interbank payments takes place once a day at the Netherlands Bank on a net basis.

3.3.5 Transaction processing environment

Although processing takes place in two operating centres, the clearing house system, CSS, operates in an integrated manner. Transfer orders may be submitted in different ways, by both banks and corporates. The latter deliver their mass payment orders and direct debits directly to the clearing house via data communication lines or on magnetic tapes. Banks use the same kind of data carriers, but may also present bulk payment orders on paper, in which case Interpay takes care of their conversion into digital form. Interpay processes paper-based standard payment orders, as well as cheques and “accept giros”, using image processing technology. Consequently, Dutch banks do not need to exchange any paper-based payment information.

On 1 October 2001, the old “bulk settlement”, in which all retail transactions were cleared in two daily runs at Interpay, was replaced by the “lot settlement” procedure. There are two types of transaction bundles, the so-called “debit” and “credit” lots. Debit lots are compiled for one bank at a time, and contain only transactions with that bank on the debit side and several payees on the credit side, such as salary payments or creditor payments by business clients. Credit lots include transactions involving several banks on both the debit and the credit side, such as in payment transfers, ATM withdrawals and EFTPOS payments. The clearing of retail payments closes every 30 minutes for settlement at the Netherlands Bank and then reopens for the next clearing round. Banks may increase the frequency for debit lots by specifying a maximum total amount. Routing for the debit and credit banks involved takes place on the basis of a central file, containing all the account numbers and customers’ names and addresses.

Payment orders delivered before 15:30 can be settled the same day.

The banks have a common account numbering system, which allows for automated error controls. All numbers contain nine digits and are centrally distributed by Interpay. Although it is not a formal participant in the clearing house, the Netherlands Bank also makes use of the Interpay account numbering system.

3.3.6 Settlement procedures

Interpay is authorised by the participating banks to effect the daily settlement payments at the Netherlands Bank on their behalf. During settlements, short banks pay their due amounts on Interpay’s clearing account at the Netherlands Bank, after which Interpay pays out to the long banks. Settlement of the debit and credit lots takes place about every 30 minutes between 07:30 and 17:00. Multiple settlement reduces systemic risk, improves the service to banks by providing irrevocable output after settlement of each lot, and speeds up the overall processing time of transfer orders.

Settlement of the Telegiro subsystem takes place at around 14:00. Settlement is subject to sufficient cover for debit positions. During the course of the morning, banks are informed by Interpay of the net results to be expected so that they can raise additional liquidity in the money market before settlement time, if need be.

3.3.7 Credit and liquidity risks and their management

Credit and liquidity risks are not managed within the clearing house system, but rather in the TOP via the system’s relationship with the money market. Interpay informs the participating banks of the net retail clearing results to be expected, this information then being used by the liquidity managers of the banks. Credit and liquidity risks are limited in the Telegiro subsystem as well as in TOP, owing to the fact that it is fully collateralised. The introduction of multiple net settlement further limits the risks stemming from the net settlement process.

3.3.8 Pricing policies

The basic pricing policy of Interpay is that the system should be self-financing. For this reason, prices are based on full cost recovery (which covers cost and a surplus percentage). In practice, a certain amount is paid per transaction and per batch, by both sender and receiver.

3.3.9 Main projects and policies being implemented

Next to lot settlement, another improvement concerning the speed and reliability of payment processing is the possibility of making a direct connection from customers' administrative systems to Interpay's technical infrastructure: I-connect offers banks and firms several ways of connecting their administrative systems directly to the processing system. Using an internet browser in a Windows setting facilitates the dial-up process either by way of a local service provider or via a direct line to Interpay. Mass transfer orders (over 50,000) are transported by ISDN lines using the File Transfer Protocol.

Furthermore, Interpay is working on a new way of electronically processing accept giros without using paper forms, which can be described as electronic billing. Instead of sending a paper invoice together with an accept giro form by post, suppliers would send it electronically to Interpay, which would forward it to the website of a debtor's bank. Debtors would receive a message saying where to find it and would electronically make out and deliver their order to transfer the due amount.

4. Securities settlement systems

In September 2000 the AEX, the BXS and the Paris Bourse officially merged into Euronext. A single integrated market was formed, comprising a cash market for equities and bonds, a derivatives market and a commodity market. Merging all the exchange-related activities is taking place in phases. The first phase, introducing a single platform for trading with unified listing and trading rules, with the former national exchanges becoming local entry points, was implemented during the course of 2001. The second, unified clearing, is expected to be finalised by the end of 2002. Clearing of securities and options will be centralised in Paris (Clearnet). The third phase, a single settlement and custody platform, provided by Euroclear, is expected to be in place by the end of 2003. The cash settlements will continue to take place in the systems of the NCBs and securities settlement will continue to be executed across the books of the national depositories.

Since its launching, Euronext has expanded its European presence by taking over LIFFE, the UK derivatives exchange, in December 2001 and merging with Bolsa de Valores, the Portuguese exchange, in February 2002. Cross-membership and cross-access agreements have been signed with the Luxembourg and Warsaw stock exchanges.

As the phased integration process is still under way, this section mainly describes the transition period.

4.1 Trading

4.1.1 Integrated trading in Euronext

The three domestic financial centres continue to use their local primary markets for listed companies. The listing requirements have been harmonised such that Euronext operates as a single integrated exchange for all listed securities. There is a single group of listed securities, although these securities enter the market via one of the three listing centres (Amsterdam, Brussels or Paris). Each listed security is accessible to all Euronext members, regardless of the nationality of the issuer or the member. It has been agreed with the regulators in the three member countries that a member licensed in one particular market will automatically receive a passport enabling it to operate in another Euronext country as well.

With regard to cash securities, Euronext already provides a unified order-driven trading platform based on the French system NSC (*Nouveau Système de Cotation*). With regard to derivatives, in order to operate a single options market accessible from each of the three Euronext entry points, migration from floor trading to electronic trading will be achieved by December 2002. Moreover, Euronext

acquired the London International Financial Futures and Options Exchange (LIFFE) and chose to migrate to the LIFFE CONNECT electronic system. Euronext Brussels and Paris will introduce LIFFE CONNECT in March and April 2003 respectively, with Amsterdam and Lisbon following at a later date. Euronext's and LIFFE's derivatives markets will be integrated under the name Euronext.liffe.

4.1.2 Securities trading

Securities trading has been fully harmonised since October 2001, when the NSC system, which was already in use in France and Belgium, was introduced in the Netherlands.

At the end of 2001, 1,539 companies, representing a market capitalisation of EUR 2,070 billion, had shares listed on the Euronext securities market, which is segmented as follows. The top segment comprises the 100 largest companies in terms of market capitalisation and certain minimum liquidity criteria. The second segment consists of the next 150 largest companies. In addition to these "Top Stocks" segments, Euronext operates segments designed for companies operating in the New Economy (Next Economy) and for small and mid-cap companies. Euronext also has a bond segment for both government and corporate bonds.

Securities markets

Transactions in listed securities on the retail market must be settled through the Euronext order book. With regard to the wholesale market, prices may be determined outside the Euronext Amsterdam Stock Exchange. The exchange, however, must be notified of the transaction and the price at which it was concluded. Prices of these so-called block trades may differ by only a certain percentage from the order book prices. Euronext discloses the direct deal turnovers to the market to promote fair pricing in the retail segment.

The Euronext Amsterdam Stock Exchange opens at 09:00 and closes at 17:30.

Financial intermediaries

Securities trading is conducted through admitted institutions, intermediaries authorised by Euronext Amsterdam to perform certain functions. Two main categories of intermediaries can be distinguished: brokers and dealers. Brokers trade exclusively on account of third parties, which can be other members. Dealers are allowed to trade on their own account only and certain dealers act as liquidity providers. Liquidity providers take positions against buyers or sellers, where necessary by entering buy and sell prices in the electronic order book for a range of securities assigned to them by Euronext Amsterdam. Apart from this functional difference, a distinction is made between securities credit institutions and non-securities credit institutions, the difference being registration at the Netherlands Bank. As the latter are not under the Netherlands Bank's supervision, they need the cooperation of a bank for the settlement of both their cash and their securities positions.

Trading systems

The NSC system is essentially an order-based system, which means that buy and sell orders are placed in the electronic order book and prices are determined by matching of corresponding orders. In the NSC system two different trade procedures exist: continuous trading and auction trading. The more liquid securities are continuously traded, whereby orders are directly matched in the electronic order book and price determination is a continuous process. Less liquid securities are traded in auctions. All incoming orders are collected in the electronic order book and auctioned twice a day. To enhance liquidity, Euronext Amsterdam has introduced a liquidity providing system (ELPS). For certain securities, traders act as liquidity providers, which means that they are obliged to quote prices in these securities when liquidity is low. This introduces a quote-driven element into the system. In a quote-driven system prices are determined by the quotations made by market-makers or dealers.

4.1.3 Derivatives trading

Derivative markets

Euronext Amsterdam Derivative Markets N.V. is responsible for organising trading in derivatives, a category which includes options on shares, bonds, precious metals and currencies, as well as financial

and agricultural futures. Options and futures are also traded on a number of indices, such as the AEX index, which measures the performance of 25 leading Dutch companies.

Financial intermediaries

Three main categories of intermediaries can be distinguished: brokers, traders and public order correspondent members (the last mentioned only exist on the option market). Brokers can be divided into introducing brokers and executing brokers. An introducing broker trades derivatives on account of third parties and on its own account. The orders of an introducing broker are carried out through the services of an executing broker, which executes trades on its own account or for other members. Public order correspondent members trade options through the services of an introducing broker, on their own account or on account of third parties. Traders only trade on their own account and some traders act as liquidity providers. Their main function is to ensure that quotes, in option classes assigned to them, are continuously available.

Trading systems

Contrary to the Euronext Amsterdam Stock Exchange, Euronext Amsterdam Derivative Markets is still not fully screen-based. Trading is conducted centrally either on the exchange floor on an open outcry basis or via the screen-based system, with a high level of computerisation in the area of order routing. In order to ensure that investors are always able to trade, the derivative markets require that liquidity providers provide continuous bid and offer prices, or quotes. The order routing system on Euronext Amsterdam Derivative Markets, Switch, is a system with a fully computerised order book. Orders are submitted electronically and completed transactions are confirmed in the same way. Limit orders which cannot be executed immediately can be placed in the electronic order book.

On 26 November 2001, Euronext launched a pilot project with some options categories migrating to fully screen-based trading. Due to the success of this pilot, full migration to electronic trading will be achieved three months earlier than originally planned; by the end of 2002, all the products that are quoted on Euronext Amsterdam Derivative Markets will be traded electronically. At a later date derivatives trading on Euronext Amsterdam will migrate to LIFFE CONNECT.

Trading in financial futures takes place between executing brokers and traders. Brokers and traders quote their prices and conclude transactions. Traders and brokers also specify the number of contracts covered by the prices they quote. Prices are quoted in competition with other traders. Trading in financial futures is fully screen-based.

Trading on the agricultural futures market also takes place (since August 2002) through a fully screen-based system. Investors can buy and sell futures on potatoes and pigs, or trade options having potato futures as their underlying instrument. In terms of volume, the Amsterdam agricultural futures market was Europe's second largest exchange for agricultural products in 2000.

Euronext Amsterdam Derivative Markets also allows professional parties to conclude options contracts outside the central market and still present them for settlement at the Exchange. These are referred to as OTC (over-the-counter) transactions. In the Euronext Amsterdam Derivative Markets these OTC transactions are referred to as professional (or "Prof") transactions. These contracts must fully comply with the Exchange's standard specifications with regard to maturity, underlying instrument and exercise price. In the "Prof" system, transactions are settled in the same way as Exchange transactions. Contracts on the OTC market are negotiated by the market participants in bilateral consultations. On the OTC market, there is more choice and flexibility.

4.2 Clearing

4.2.1 Integrated clearing in Clearnet

Since 1 February 2001, the clearing functions of the three Exchanges have been centralised at Clearnet SA, the clearing house of Euronext Paris, with branches in Brussels and Amsterdam (Clearnet Amsterdam Branch).

Assets and liabilities of the national clearing systems have been transferred to Clearnet SA, which became the central counterparty (CCP) to all transactions on all Euronext exchange floors. The software (Clearing21) combines clearing functions for equities and bonds with clearing functions for

derivatives (integrating positions and risks on different markets). Clearing21 is used in Brussels and Paris and has been in use in Amsterdam for the securities market since 25 October 2002. Prior to that date, the national clearing system was in use. With regard to the options market, Euronext plans to complete the integration of the clearing institutions by the end of 2003.

4.2.2 Securities clearing

In Amsterdam, there are separate clearing institutes for securities and derivatives. These are subsidiaries of Euronext Amsterdam Clearing & Depository and are called Euronext Amsterdam Stock Clearing and Euronext Amsterdam Derivatives Clearing (since 1 February 2001 operating as Clearnet Amsterdam Branch). In both cases, Clearnet acts as the CCP and guarantees the settlement of transactions. Settlement of securities takes place on a net basis at Necigef, which is now a subsidiary of Euroclear. OTC transactions can be settled immediately on a gross basis, either through the clearing institute or through the Trade-for-Trade facility offered by the Netherlands Bank and Necigef.

Clearnet organises the clearing and settlement of all retail transactions and part of the wholesale transactions on the Stock Exchange.

Through the trading day (since October 2002), trades are automatically entered into the securities clearing systems. Clearnet becomes the counterparty to both parties to a transaction as soon as the trade has been processed and transaction confirmation reports have been sent to the clearing members. By placing itself between the two parties, Euronext Amsterdam Stock Clearing guarantees the completion of every transaction.

Clearing member structure

Clearing is based on a layered clearing member structure: the clearing organisation forms the top layer, the clearing members are in the layer below, followed by the admitted institutions and by their customers. In principle, the clearing organisation deals with the clearing member only and the clearing member in turn deals with the admitted institution, and the institution with its customers, etc. This is also referred to as the principal-to-principal relationship.

Participating clearing members may become a general clearing member or direct clearing member. Direct clearing members are only permitted to clear transactions for their own customers or for themselves. General clearing members can also settle transactions on behalf of other exchange seaholders, which in turn have their own customers.

4.2.3 Options clearing

Clearnet organises the clearing and settlement of all derivatives transactions.

At the end of the trading day, trades are transmitted via an automatic link from the options market systems to the derivatives clearing system. As soon as options clearing has processed the trades and sent transaction confirmation reports to clearing members, it automatically becomes the clearing member's counterparty. The clearing member's position with Clearnet is held by an affiliated bank or stockbroker. Clearing members acting for market-makers hold a position on behalf of their affiliated market-makers.

Clearing members

Similarly to securities clearing, options clearing is based on a system of clearing members. Clearing members are exchange seaholders and must meet special requirements in the areas of expertise, risk management and capitalisation. Their responsibility is to settle transactions for their own account and for third parties. Seaholders which are not clearing members have to make arrangements with a clearing member for the settlement of their transactions.

Clearnet guarantees that every transaction it accepts will be completed (by virtue of its principal-to-principal relationship with clearing members). It acts as the counterparty to every buyer and seller. Clearing members give their customers the same guarantee. Clearnet requires collateral for positions in options and futures, as stipulated in a set of risk management rules. Margin requirements are a vital aspect of this system, providing a buffer against the risks involved in options and futures trading.

Professional parties qualify for special arrangements, which are geared to the specific needs of the OTC market in options. Under the terms of the "Prof" regulation, for example, contracts with the same

specifications as exchange-traded contracts can be traded OTC and still be presented to the Exchange for clearing.

Clearing and settlement of commodities market transactions takes place through the EA Commodity Clearing, formerly known as NLKKAS, which combines a clearing house function with a clearing member function.

4.3 Settlement

4.3.1 Integrated settlement in Euroclear

Settlement involves the transfer of ownership of securities. For the time being, Euronext settles securities at the local CSDs. Furthermore, cash settlement takes place in central bank money in the country where the clearing member involved is headquartered.

In order to create a single platform for both clearing and settlement, a joint venture is planned between Euronext and Euroclear aimed at centralising all settlement and depository functions for cash, equities, bonds and derivatives, in a single system within the Euroclear corporate structure. Euroclear is an ICSD which has taken over the national CSDs and which settles transactions involving international and domestic securities using a network of local correspondents for both money and securities settlement. Euroclear does not act as a CCP. Euroclear is to provide settlement in central bank as well as in commercial bank money.

The French CSD, Sicovam, merged with Euroclear at the beginning of 2001. Since 30 April 2002, 100% of Necigef's shares have been in Euroclear's hands. The Belgian CSD, CIK, has concluded an agreement with Euroclear as well.

4.3.2 Securities settlement

Transactions in securities can be settled in two different ways: via the netting system or via the Tft facility.

Exchange settlement

The vast majority of all settlements at Clearnet are processed using the netting system. Settlement consists of the delivery of the relevant securities to the Stock Clearing, which delivers the securities to the designated recipient. The Stock Clearing determines the amount of the different securities that each clearing member should deliver or receive and determines the countervalue in euros of every delivery or receipt. At the end of the day, all positions held at the Stock Clearing are netted. Transactions are settled on a net basis on T+3, ie on the third trading day after the transaction. The Stock Clearing also initiates cash settlement between the deliverer and recipient. Settlement vis-à-vis the common counterparty takes place on a DVP basis. Money transactions in euros are handled by the Netherlands Bank. In 2001, the volume of these settlements amounted to 10,426 for the Stock Clearing and 1,409 for the Derivatives Clearing. The exchange transactions can be conducted from 21:00 until 17:30.

Off-exchange settlement

In addition to the settlement of on-exchange transactions and free-of-payment transfers, Necigef offers a facility for DVP settlement of off-exchange transactions, called Tft (Trade-for-Trade), in cooperation with the Netherlands Bank. Each transaction is settled individually. Securities are transferred between accounts kept at Necigef, while funds transfers are made in real time via the accounts held by the relevant Necigef participants at the Netherlands Bank. As transfers made in Necigef and in TOP are final and irrevocable, there is no counterparty risk. In 2001, the Netherlands Bank settled 1.5 million Tft transactions with a total value of EUR 890 billion. Tft transactions can be made between 20:30 and 22:00 and 7:00 and 15:30.

4.3.3 Central securities depository - Necigef

The Dutch CSD, Necigef, is a part of Euronext Amsterdam's operations. The depository is responsible for book-entry transactions and the custody, management and administration of all kinds of securities

on behalf of Necigef participants. When banks deposit securities held by their customers with the depository, book-entry positions appear which make it possible to settle securities transactions by book-entry transfer. When the depository declares that securities have been admitted to the book-entry transfer system, these securities are governed by the Dutch Securities Giro Act. This means that the investors in those securities are joint owners of the securities in the system and their ownership rights will not be affected if their bank or the depository goes into receivership. Consequently, there is no counterparty risk in this settlement system.

The vast majority of all Dutch securities are registered at Necigef. In December 2001, the total number of issuers registered was 2,884. Securities and bonds in custody accounted for a total value of EUR 820 billion (securities valued at market price and bonds at nominal value). The sharp fall in physical securities movements and the need to improve efficiency have led many issuers to eliminate physical certificates (dematerialisation). This is often done by replacing the original certificates with a single global note. The adaptation of the Securities Transfer Giro Act in November 2000 made full dematerialisation possible for the first time. The shift from bearer securities to book entry-type securities now has a legal basis.

Necigef is linked to CSDs in Austria, Belgium, Finland, France, Germany, Switzerland and the United Kingdom.

4.3.4 Credit and liquidity risk management

Credit and liquidity risks are mainly controlled by margin requirements applicable to the participants and by the involvement of the Netherlands Bank as collateral manager, liquidity provider and settlement bank.

Collateral requirements

In order to secure the settlement of transactions, Clearnet requires clearing members to provide collateral for the fulfilment of margin obligations and as a contribution to the clearing fund.

The clearing organisation acts as the CCP in transactions. In the event of default by one of the parties, it may itself have to purchase the securities to be delivered by the defaulting party or, in the case of an obligation to purchase, to sell the purchased securities. Consequently, it is also exposed to market risk arising from unexpected price movements. To that end, it obliges clearing members to provide collateral to equalise the margins required to fulfil the financial obligations. These margins are calculated on the basis of the obligations ensuing from positions taken (initial margin) and from non-realised profits and losses (variation margin). The collateral may consist of underlying instruments (cover on Euronext Amsterdam), domestic or foreign securities, or debt instruments.

In addition to margin requirements, a clearing fund has been established, which serves as a supplementary form of guarantee. It provides a joint guarantee to the clearing members in return for which they are required to pledge securities as collateral (Tier 1 and Tier 2 assets). The clearing fund's size is computed on the basis of contributed risk.

The total clearing fund of the Stock Clearing should at least cover the price risk that arises for the clearing member with the largest position. This fund amounts to a minimum of EUR 70 million. The total clearing fund of the Derivatives Clearing is calculated on the basis of clearing members' average number of open options in a certain option fund or option series multiplied by a fixed amount per contract. The clearing fund of the Options Clearing has no minimum level and currently stands at EUR 300 million.

The Netherlands Bank's involvement

Settlement bank

The Netherlands Bank acts as a settlement bank for Euronext Amsterdam Stock and Derivatives Clearing. Every working day, early in the morning, the Netherlands Bank settles the outcome of both clearing processes in TOP. As mentioned above, off-exchange transactions are settled on a gross basis at the Netherlands Bank as well.

Management of collateral

The Netherlands Bank manages the collateral for both Euronext Amsterdam Stock Clearing's and Derivatives Clearing's margin obligations as well as for both clearing funds. Clearing members meet their margin requirements by means of a guarantee based on collateral deposited at the DNB in the form of book-entry securities. Banks keep their collateral - which can be used for exchange-related purposes, but also for Eurosystem monetary policy operations and intraday credit for payment purposes - on a collateral account at the Bank.

Guarantee model

The Netherlands Bank, in collaboration with Clearnet, introduced the so-called "DNB offer" or "guarantee model" on 22 January 2002, as an extension to its collateral management function. Under this model, clearing members with branches in other Euronext countries can meet their collateral requirements by a guarantee based on collateral deposited centrally in one of the Euronext countries. This enhances the efficiency of their liquidity management, as they do not have to allocate collateral for the exchange under different jurisdictions. The information about the respective amounts of the Margin and Clearing Funds are transmitted to Clearnet Paris. The Netherlands Bank differs from the other central banks involved in that the Bank freezes every morning exactly the amount it receives from Paris for the trades of the coming day.

Liquidity arrangement

In the event that a clearing member can no longer meet its settlement obligations, a liquidity problem arises at Clearnet, which has to be resolved as though it were a potential systemic risk. Although Clearnet has sufficient collateral - under the margin and clearing fund structure - to bear the financial consequences, it would need a large amount of cash at short notice in order to complete the settlement of funds transfers with clearing members before the exchange opens. To that end, the Netherlands Bank provides intraday liquidity, one of the fundamental requirements set by the overseer in the context of risk management, up to a maximum value of EUR 68 million. In the event that overnight liquidity were required, this would be provided by Clearnet.

**Payment systems in
Singapore**

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List of abbreviations

ABS	Association of Banks in Singapore
BCCS	Board of Commissioners of Currency, Singapore
BCS	Banking Computer Services Pte Ltd
CCA	Controller of Certification Authorities
CDP	Central Depository (Pte) Limited
CTS	Cheque Truncation System
DCSS	Debt Securities Clearing and Settlement System
ECS	Electronic Clearing System
EPTC	Electronic Payments Technical Committee
FOP	Free of payment
IBG	Interbank GIRO
IDAS	Institutional Delivery Affirmation System
IFT	Interbank Funds Transfer
IOB	Internet-only bank
MAS	Monetary Authority of Singapore
MCB	Minimum Cash Balances
MEPS	MAS Electronic Payment System
MLA	Minimum Liquid Assets
NETS	Network for Electronic Transfers (Singapore) Pte Ltd
QFB	Qualifying full bank
QOB	Qualifying offshore bank
SACH	Singapore Automated Clearing House
SCHA	Singapore Clearing House Association
SGDCCS	Singapore Dollar Cheque Clearing System
SGS	Singapore Government Securities
SGX	Singapore Exchange
USDCCS	US Dollar Cheque Clearing System

Introduction

A payment system comprises the cultural, political, legal, economic and business practices and arrangements used within a market economy to determine, store and exchange value or ownership of goods and services. In its simplest form, a payment stems either from a trade between buyers and sellers in a market or from a financial obligation.

Modern payment systems in a market economy can be modelled in three major segments: first, the instruments used to deliver payments; second, the clearing and settlement process involved in a payment transaction; and finally, the actual transfer of funds between institutions.

Singapore's payment system has evolved over the years, driven by technological progress, changing consumer needs and development of new financial activities. It has changed from one that was based essentially on paper and cash transactions to one today that has a diverse range of cashless payment instruments, as well as efficient and reliable clearing and settlement systems.

In Singapore, the common methods of making retail payments besides using currency comprise cheques and interbank GIRO debit and credit transfers as well as payment cards (stored value, debit and credit cards). Banks' customers can also use their debit cards to make third-party account funds transfers and to make bill payments to selected commercial and government entities via the ATMs. More recently, banks' customers have been able to make bill payments and third-party funds transfers through their telephone, mobile and internet banking services.

The Monetary Authority of Singapore (MAS) operates a real-time gross settlement system, MAS Electronic Payment System, for large-value local currency interbank fund transfers and the settlement of scripless Singapore Government Securities.

1. The institutional aspects

1.1 The general legal and regulatory framework

A number of laws and bye-laws have a bearing on payment instruments and institutions in Singapore.

Cheques and GIRO transactions cleared through the Automated Clearing House are regulated by the following laws and bye-laws:

- *Section 59 of the Banking Act* allows MAS, in conjunction with banks and other financial institutions, to establish a Clearing House to facilitate the clearing of cheques and other credit instruments, and ensure its smooth operation.
- *Banking (Clearing House) Regulations, Cap. 19, Regulation 1*, subsidiary legislation administered by MAS, sets the framework with respect to clearing with the Automated Clearing House.
- The *Bills of Exchange Act* governs how cheques are drawn, accepted and paid.
- The *Bye-laws of the Singapore Clearing House Association (SCHA)* state the rules and regulations for participation in the clearing of cheques and GIRO.

Section 77A of the Banking Act states that only banks authorised by MAS can issue stored value instruments that have multiple payment capabilities.

Section 59A of the Banking Act makes provision for MAS to establish and operate one or more real-time gross settlement (RTGS) systems. MAS is responsible for the smooth operation of the RTGS system and ensures that participants comply with the rules and regulations.

The *Currency Act (Chapter 69)* established the Board of Commissioners of Currency, Singapore (BCCS) in 1967. The Act conferred on the BCCS the sole right to issue currency in Singapore. A notable provision of the Act is that the Singapore dollar must be 100% backed by external assets. This is achieved through the maintenance of a currency fund consisting of foreign currencies, demand and time deposits, treasury bills and securities, and gold.

With the increasing trend towards electronic transactions, digital signatures are becoming more important, both for identification purposes and to serve as an alternative to hand-written signatures. Digital signatures are also useful in preventing unauthorised alteration of the contents of electronic documents. On 10 July 1998, the *Electronic Transactions Act* was enacted to provide for the legal recognition of digital signatures and establish the framework to facilitate electronic commerce transactions in Singapore.

The Central Depository (Pte) Ltd (CDP), a wholly owned subsidiary of the Singapore Exchange (SGX), operates the securities clearing and settlement systems for securities listed or quoted on Singapore Exchange Securities Trading Ltd (SGX-ST), including equities, corporate debt securities and other instruments such as warrants and exchange traded funds.

MAS regulates CDP as a clearing house under the *Securities and Futures Act* (SFA).

MAS is the fiscal agent of the Singapore government. MAS is empowered by the *Development Loan Act* and the *Government Securities Act* to undertake the issue and management of Singapore Government Securities (SGS) on behalf of the government. MAS also operates the securities clearing and settlement systems for SGS and ensures that participants comply with the rules and practices of the SGS market.

1.2 The role of the Monetary Authority of Singapore

The Monetary Authority of Singapore (MAS) was established as a statutory board under the Monetary Authority of Singapore Act in 1970. Its mission is to promote sustained non-inflationary economic growth and a sound and progressive financial services sector.

MAS acts as a settlement agent for the banking institutions in Singapore, by allowing funds transfers to take place across the banks' settlement accounts held with MAS.

MAS also handles government-related payments and receivables that usually take the form of funds transfers between the government's accounts with MAS and with banks.

MAS operates the real-time gross settlement system MEPS which settles large-value interbank funds transfers (see Section 3.2). MEPS is also designed to handle the settlement of scrippless Singapore Government Securities (SGS). Payment obligations that arise from trading in SGS and other Singapore dollar-denominated corporate debt may be settled on a delivery versus payment (DVP) basis via interfaces to the interbank funds transfer system in MEPS (see Section 4.2).

1.2.1 Development and regulation of payment systems

As part of its mission to promote a sound and progressive financial services sector, MAS oversees the payment system to ensure its overall safety, efficiency and development. MAS thus puts in place or facilitates relevant policies, practices and principles used throughout payment, clearing and settlement systems in Singapore.

MAS has explicit legislative powers to establish and operate RTGS systems, oversee the management of the cheque and Interbank GIRO systems and regulate the issuance of multipurpose stored value cards. These powers are spelt out under the various Acts and Regulations as highlighted in Section 1.1. In addition, MAS exercises oversight in other payment areas indirectly through banks. MAS has a good working relationship with payment system participants and stakeholders which complements its legislative role in the respective systems. MAS often relies on extensive industry consultation to ensure its objectives for the payment system are achieved.

1.3 The role of other private and public sector bodies

1.3.1 Singapore Clearing House Association (SCHA)

The SCHA is an association, formed in December 1980, to establish, manage and administer clearing services and facilities for cheques and debit and credit items of its members. It comprises MAS and the commercial banks in Singapore that wish to become members. As at end-December 2000, the SCHA had 48 ordinary members and 87 associate members. The SCHA establishes the rules on the rights and responsibilities of participating banks as well as the service providers for the various

clearing systems; it is also responsible for the Singapore Automated Clearing House (SACH), which operates the Singapore Dollar Cheque Clearing System, the US Dollar Cheque Clearing System, and the Interbank GIRO System.

1.3.2 Association of Banks in Singapore (ABS)

The ABS is made up of member banks drawn from a wide spectrum of banking entities licensed by MAS. It represents the interests of its members, sets minimum standards of good practice for these members and supports projects that are mutually beneficial.

The ABS also holds regular discussions with MAS regarding industry issues and the promotion of a sound financial system in Singapore. The ABS provides input for legislation and guidelines relating to the industry, including on payment and settlement systems.

1.3.3 Electronic Payments Technical Committee (EPTC)

The EPTC is an industry-based group established by the Information Technology Standards Committee (ITSC) under the auspices of the Singapore Productivity and Standards Board and the Infocomm Development Authority of Singapore.

Its mission is to identify, review and propose standards for adoption in Singapore in the following areas:

- Electronic bill presentment and payment systems/services
- E-payment infrastructure, systems and services
- Electronic commerce
- Mobile commerce
- Public key identification/Certification authority infrastructure, interoperability and connectivity.

Member organisations participate in various projects to recommend standards. When standards are established, EPTC will also hold roadshows and workshops to promote the standards to the industry.

As at December 2000, EPTC had over 35 member organisations from the financial sector, including MAS, most major banks, credit card companies, e-commerce systems vendors and payment services firms.

1.3.4 Controller of Certification Authorities (CCA)

As specified under the *Electronic Transactions Act*, the CCA oversees the activities of certification authorities (CAs), by licensing, certifying, monitoring developments and using other controls.

The licensing scheme for CAs is voluntary. It promotes high-integrity CAs that can be trusted. A licensed CA enjoys the benefits of evidentiary presumption for its digital signatures. A CA wishing to obtain a licence must meet stringent licensing criteria in various aspects, including financial soundness, personnel integrity, strict security controls and procedures. The licensing criteria are stipulated in the *Electronic Transactions Act 1998*, *Electronic Transactions (Certification Authorities) Regulations 1999* and the *Security Guidelines for Certification Authorities*.

The CCA is subsumed under the Infocomm Development Authority of Singapore.

1.4 The role of financial intermediaries

1.4.1 Banks

Singapore's payment landscape is predominantly the domain of banks.

Commercial banks in Singapore are allowed to engage in a wide range of financial services. These include traditional banking services such as loans and deposits, and investment banking business such as underwriting and distribution of equity and debt securities, corporate finance, fund

management and unit trust management. As at end-December 2000, there were 134 commercial banks in Singapore, eight of which were locally incorporated.

Commercial banks are licensed under the *Banking Act* (Chapter 19). Their activities are also governed by MAS' Notices to Banks and guidelines issued from time to time. There are three categories of commercial banks in Singapore: full banks; wholesale banks; and offshore banks.

Banks are currently the only institutions able to process across all segments of the payment process chain (acquisition, processing, clearing and settlement). However, new payment service providers are expected to play a greater role in the coming years.

1.4.1.1 Full banks

Full banks are authorised to transact the whole range of banking business, both personal and corporate. These include the operation of current, savings and fixed deposit accounts, financing of exports and imports, transfer of funds, commercial letters of credit, trust receipts, traveller's cheques and currencies. Full-licensed banks may also provide advice on trade and investment and foreign exchange regulations, and may furnish credit reports and trade information.

Most full-licensed banks provide the full range of retail payment services such as cheque services, funds transfers, issuance of credit and debit cards, and ATM services. As at end-December 2000, there were 31 full-licensed banks, eight of which were locally incorporated banks and the remainder branches of foreign banks. Foreign full banks face some restrictions on the setting-up of branches and offsite ATMs. Currently only local banks can provide EFTPOS services.

1.4.1.2 Wholesale banks

Formerly known as restricted banks, wholesale banks may engage in the whole range of banking activities afforded to a full-licensed bank except that they may not:

- (1) accept Singapore dollar fixed deposits of less than SGD 250,000 per deposit from non-bank customers;
- (2) pay interest on Singapore dollar current accounts operated by resident individuals.

As at end-December 2000, there were 20 wholesale banks in Singapore, all of which were branches of foreign banks.

1.4.1.3 Offshore banks

The category of offshore banks was introduced in 1973 with the aim of improving the scope of activity in the Asian dollar market. Offshore banks enjoy similar opportunities to full and wholesale banks for business in the offshore market, but their scope of business in the Singapore dollar retail market is limited.

In addition to the conditions imposed on wholesale banks, offshore banks also cannot:

- (1) accept interest-bearing Singapore dollar deposits from resident non-bank customers other than approved financial institutions;
- (2) extend total credit facilities in Singapore dollars exceeding SGD 500 million to non-bank customers who are residents of Singapore. Qualifying offshore banks can offer credit facilities of up to SGD 1 billion.

As at end-December 2000, there were 83 offshore banks in Singapore, all of which were branches of foreign banks.

1.4.2 Banking liberalisation programme

In May 1999, MAS announced a five-year programme to liberalise commercial banking in Singapore. This was aimed at promoting a more open and competitive environment and to spur the development and upgrading of local banks.

MAS granted qualifying full bank (QFB) privileges to four foreign banks, wholesale banking licences to eight offshore banks and qualifying offshore bank (QOB) status to eight offshore banks. In addition to the normal privileges accorded to a foreign full bank, the QFB privileges allow the banks, inter alia, additional branches and ATMs.

In June 2001, MAS further announced that it had awarded another two banks QFB status and grant all QFBs enhanced privileges in branching and establishing offsite ATMs.¹ In addition, from 1 July 2002, QFBs are allowed to provide debit services on an EFTPOS services. Restricted and offshore banking licences (including QOB) will be consolidated into a new wholesale banking licence. Wholesale banks will be able to engage in all activities of the restricted banks. For a start, all current restricted banks are renamed wholesale banks and MAS will issue a further 20 wholesale banking licences within the next two years, with priority accorded to existing QOBs.

(More information on the banking liberalisation programme, including how new licences are granted, can be found on the MAS website at www.mas.gov.sg.)

1.4.3 Internet-only banks (IOB)

MAS issued a policy statement on internet banking in July 2000. MAS is prepared to grant new banking licences for Singapore-incorporated banking groups to set up separate banking subsidiaries (including joint venture entities) to pursue new business models, including internet-only banking, outside their existing banking entities. There is currently one bank operating under the IOB business model.

2. Payment media used by non-banks

2.1 Cash payments

As in most countries, currency remains the most accepted payment medium for small-value transactions in Singapore.

The BCCS has the sole right to issue currency and coins. Notes are in circulation in denominations of SGD 1, 2, 5, 10, 20, 50, 100, 500, 1,000, 5,000 and 10,000. Coins are issued in denominations of SGD 0.05, 0.10, 0.20, 0.50 and 1.00. SGD 0.01 coins ceased to be issued in 2002, although they remain legal tender.

Singapore dollars in circulation are fully backed by a basket of external assets that includes gold and other foreign currencies.

2.2 Non-cash payments

2.2.1 GIRO

The Interbank GIRO (IBG) system is an offline interbank payment system catering mainly for low-value bulk payments. IBG allows a customer of a participating bank to transfer funds, through direct debits or credits, to or from the accounts of customers of any other participating bank. The IBG can be broadly separated into two classes according to the type of transfers: direct debit transfers and direct credit transfers.

2.2.2 Credit transfers

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

¹ With the second phase of banking liberalisation, each QFB is permitted to establish up to 15 locations, of which up to 10 can be branches. The 15 locations can include both branches and off-site ATMs. The sub-limit of 10 branches can include branches and limited-purpose branches.

Some banks have recently offered direct crediting services to their individual customers, mainly through internet banking and ATMs. These individual instructions are processed together with the bulk credit instructions for that day.

The number of IBG transactions processed in 2000 was 30 million, for a value of SGD 72 billion.

2.2.3 Direct debits

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. Examples of such preauthorised recurring payments include utility bill payments or payments for telecommunications services.

2.2.4 Cheques

Cheques are commonly used in Singapore by consumers for bills and small-value payments and among businesses for regular payments such as purchases of goods and services.

The number of cheques cleared by the SACH increased by more than 70% from 1989 to 1999. This can be attributed to the increased economic activity in Singapore in that period.

In 2000, 91 million cheques for a total value of SGD 453 billion were processed by the SACH.

2.2.5 Payment cards

2.2.5.1 Debit cards

Debit cards can be broadly categorised into two groups: PIN-based debit cards and signature-based debit cards.

PIN-based debit cards allow cardholders to make payments or withdraw cash from their deposit accounts at ATMs and EFTPOS terminals (see Sections 2.2.5.4 and 2.2.5.5). The payment or cash withdrawal is effected through an online transfer of funds from the cardholder's account.

Visa Electron card and the Debit MasterCard are examples of signature-based debit cards in Singapore.

2.2.5.2 Credit cards

All major credit cards are offered in Singapore. The issuance of credit cards is subject to MAS guidelines and regulations, for example on eligibility criteria for card applicants and the marketing of credit cards.

Total credit card transactions amounted to SGD 10.5 billion in 2000.

2.2.5.3 Electronic money

Electronic money (more commonly known as "stored value cards" in the local context) in Singapore can be categorised into single purpose stored value cards (SPSVCs) and multipurpose stored value cards (MPSVCs). SPSVCs can only be used to pay for goods and services offered by the issuer (eg prepaid phone cards). In contrast, a MPSVC also allows cardholders to pay for goods and services offered by other merchants or organisations.

CashCard, launched in November 1996, is a MPSVC jointly issued by the three local banks.² It offers consumers a cashless payment option at a variety of retail outlets, car parks and vending machines, as well as payment of toll charges at Electronic Road Pricing gantries and the checkpoints between Singapore and Malaysia. In addition, the CashCard can be used for online purchases with the use of a card reader. The CashCard can be reused by topping up its value to a maximum of SGD 500 at ATMs,

² Development Bank of Singapore, Oversea-Chinese Banking Corporation and United Overseas Bank.

selected EFTPOS terminals and automated kiosks³ provided by NETS as well as some mobile phones and over the internet.

Over the years, CashCard has gained increasing acceptance in Singapore. In 2000, the number of CashCard transactions was 100 million for a total value of SGD 174 million.

With the incorporation of Visa's stored value mark, Visa Cash, and the adoption of the open Common Electronic Purse Specifications (CEPS), CashCard holders will also be able to transact overseas in the near future.

2.2.5.4 Automated teller machines (ATMs)

ATMs are one of the channels that allow banks' customers to perform routine banking transactions without having to visit a bank branch. The first ATM in Singapore was installed in 1979 by Chartered Bank. Since then, many banks have followed suit, installing their own models of ATMs.

Since their introduction, ATMs have played a major role in promoting a cashless society and in bringing greater convenience to customers. ATMs offer consumers greater ease in making deposits to and withdrawals from their bank accounts. In addition, they provide other services such as shares applications, third-party funds transfers and bill payments.

As at December 2000, there were 1,787 ATMs in Singapore, representing a penetration rate of about 445 ATMs per million inhabitants.

2.2.5.5 Electronic funds transfer at point of sale (EFTPOS)

The development of Singapore as a cashless society was boosted by the introduction of the EFTPOS service by NETS in 1986. EFTPOS is a debit card system allowing ATM cardholders to use their ATM cards to pay merchants for the purchase of goods and services through an online transfer of funds from their accounts.

As at December 2000, 20,000 EFTPOS terminals were available island-wide at over 12,000 retail outlets including major supermarkets, department stores, petrol stations, government departments and a large number of smaller merchants. In 2000, there were 77 million transactions worth SGD 4.8 billion.

The CashBack service was introduced in March 2001 to allow consumers to withdraw cash at selected retail stores through EFTPOS terminals. This service is currently provided free to the ATM cardholders of the three local banks.

2.2.6 Other access channels for banking and payments

2.2.6.1 Telephone banking

Since the introduction of phone banking in 1982, the range of phone banking services offered has increased. Besides being able to transfer funds and conduct account balance enquiries over the telephone, bank customers can also make bill payments, trade in stocks and bid for Certificates of Entitlement (COEs).⁴

2.2.6.2 Mobile banking

More recently, bank customers have been able to conduct banking transactions through the display screen features of mobile phones. In addition, they can also pay for some online purchases using their mobile phone instead of providing their credit card details over the internet. One payment method involves payers registering their credit card account details with their mobile payment service provider. Payers can then make payments using an ID and PIN as authentication and the payment is processed as a traditional credit card transaction. Another method allows the mobile payment to be reflected as another item in the payer's phone bill.

³ These automated kiosks include CashCard Automated Machines, NETS Kiosks and CashCard Service Terminals.

⁴ To own a motor vehicle in Singapore, a COE is required. COEs are awarded based on monthly bidding.

2.2.6.3 Internet banking

Internet banking allows consumers to conduct account balance enquiries, fixed deposit placements, demand draft applications and loan applications. In addition, payment services such as funds transfers (including transfers to third parties' accounts with other banks) and bill payments are increasingly available via the internet.

A number of banks have also launched internet payment services that enable consumers to pay for their internet purchases by directly debiting their bank accounts.

3. Interbank exchange and settlement systems

3.1 General overview

The major payment and clearing functions in Singapore are provided by three main organisations.

- (1) MAS operates the settlement system for large-value interbank fund transfers, ie the MAS Electronic Payment System (MEPS).
- (2) The Singapore Clearing House Association (SCHA) provides three payment clearing and settlement systems for its member banks:
 - Singapore Dollar Cheque Clearing System;
 - US Dollar Cheque Clearing System; and
 - Interbank GIRO System.
- (3) NETS manages the clearing process for the local retail payment systems such as the local banks' ATM networks, EFTPOS and CashCard networks.

Large-value electronic payments are settled within MEPS. Payment obligations that arise from trading in Singapore Government Securities and in other SGD-denominated corporate debt are settled on a DVP basis via interfaces to the interbank funds transfer system in MEPS (see Section 4.2).

The clearing systems provided by SCHA are operated by the SACH. Obligations arising out of the Singapore Dollar Cheque Clearing System and the Interbank GIRO System are settled across banks' current accounts held at MAS. There is a direct interface between the SACH and MEPS to facilitate daily multilateral net settlement of these payment obligations on a deferred same day basis.

Obligations arising out of the US Dollar Cheque Clearing System are settled across participants' accounts held with Citibank NA, the settlement agent. At a stipulated time each working day, the settlement obligations for each participant are sent to Citibank NA.

Obligations arising out of the systems managed by NETS are settled across participants' accounts held with Development Bank of Singapore Ltd (DBS), the settlement bank. NETS advises the multilateral net obligations to DBS for settlement on a deferred basis; for ATM and EFTPOS transactions this will be on a same day basis, but for CashCard transactions settlement may occur the next day.

3.2 MAS Electronic Payment System (MEPS)

MAS Electronic Payment System (MEPS) is a real-time gross settlement (RTGS) system developed for large-value Singapore dollar interbank funds transfers and the settlement of scripless Singapore Government Securities (SGS). The main feature of MEPS is the real-time and irrevocable transfer of funds and SGS. The settlement of the cash leg of SGD-denominated corporate and other government debt instruments can also be made through MEPS.

Banks' current accounts held with MAS are structured to facilitate RTGS payments. Within each current account, there are two sub-accounts: the reserve account and the RTGS account. The banks' intraday Minimum Cash Balances (MCB)⁵ requirement, if any, is maintained in the reserve account. Funds exceeding the intraday MCB requirement in the reserve account are transferred at the start of the day to the RTGS account, where they may be used for the settlement of MEPS payments. On an intraday basis, banks may also draw down the full MCB amount in their reserve account to make payments.

3.2.1 Operating rules

MEPS is owned and operated by MAS. All participating banks are contractually bound to operate in compliance with the MEPS operating rules and regulations as stipulated by MAS.

3.2.2 Participants in the system

All banks in Singapore are eligible to participate directly in MEPS. However, banks with a small volume of SGD payments may choose not to participate in the system. Instead, such non-participating banks may appoint participating banks as their agents to make SGD interbank payments on their behalf by entering into private agency agreements with any of the participating banks. The terms of such agreements are negotiated bilaterally between the banks, and are outside the ambit of MEPS. MAS, however, provides some services for these non-participating banks to transfer funds and SGS out from their MAS current accounts and SGS-Minimum Liquid Assets⁶ (MLA) accounts respectively.

There were 90 participating banks in MEPS as at December 2000. The daily turnover value for MEPS averages around SGD 35 billion and the average daily volume of transactions is around 7,000.

3.2.3 Types of transactions handled

MEPS is designed to allow large-value SGD interbank funds transfers and to settle scripless Singapore Government Securities (SGS) on a DVP basis. In addition, it also maintains a real-time system link to the Singapore Exchange (SGX) Debt Securities Clearing and Settlement System (DCSS) for the settlement of listed SGD corporate debt securities on a DVP basis.

3.2.4 Operation of the transfer system and the transaction processing environment

Each participating bank has a front-end system linked to the central host computer at MAS. The front-end system allows a bank to perform data entry, submit payment instructions and make online account enquiries. Submitted payment instructions that are not able to settle due to insufficient funds in a bank's account are queued with priority assigned by the participating bank. All queued instructions are settled according to their assigned priority levels on a first-in-first-out (FIFO) basis. The queuing mechanism has the following levels of priority:

<i>Level</i>	<i>Type of transactions</i>
1	Transactions with MAS
2	Cheque/Interbank GIRO (IBG) transactions
3	Banks' urgent transactions
4	SGS transactions

⁵ Under Section 40 of the Banking Act, all banks in Singapore are required to maintain MCB with MAS calculated as an average fortnightly amount. On a day-to-day basis, a bank's closing MCB is allowed to vary within a band of 1% above or below the required 3% MCB, ie the closing MCB balance on any day should not drop below 2% of the liabilities base and any balance in excess of 4% will not be counted towards the fortnightly average. The average closing MCB balance held over the fortnightly maintenance period must be at least 3% of the liabilities base.

⁶ Under Chapter 19 of the Banking Act, as part of the MLA requirements, all banks in Singapore must hold Singapore Government Securities equal to at least 10% of total liabilities, of which 5% must be outright holdings of SGS. The remaining SGS may be held under reverse repo transactions.

- 5 Banks' normal transactions
- 9 Banks' transactions on hold

Participants are only able to reprioritise payments at priority levels 3, 5 or 9. By moving these payments from one of these priority levels to another, banks can effectively determine the settlement sequence of their payments. To illustrate, a bank may not have sufficient balance to settle a priority 3 payment, but has enough to settle its other priority 5 payments. In this case, all priority 5 payments will not settle until the priority 3 payment is settled. Alternatively, the bank may place the priority 3 payment on hold with a priority 9, and then its priority 5 payments can be settled first.

The operating hours of the MEPS-IFT subsystem are 09:00 to 18:30 on Mondays to Fridays, and 09:00 to 14:45 on Saturdays.

3.2.5 Settlement procedures

MEPS consists of two subsystems, namely MEPS Interbank Funds Transfer (MEPS-IFT) and MEPS Singapore Government Securities (MEPS-SGS). MEPS-SGS is described in more detail in Section 4.1.3.

Under the MEPS-IFT subsystem, interbank funds transfers are made using MEPS messages, derived from SWIFT standards. As long as the paying bank has sufficient funds in its RTGS account, its same day payment instructions will be settled instantaneously and irrevocably.

MEP-IFT processes only same day value transactions. However, the system also accepts forward-dated transactions up to two working days forward. Such forward-dated transactions are stored in the host database and processed on the actual value date.

3.2.6 Credit and liquidity risks and their management

To minimise settlement risk, MAS allows banks to use the full amount of their reserves on an intraday basis. MAS may, where necessary, extend intraday credit through primary dealer banks to resolve systemic payments gridlocks. Intraday credit from MAS must be collateralised with SGS, and is extended at MAS' sole discretion. When deciding whether to extend intraday credit, MAS takes into consideration various factors, including possible systemic impact on the orderly functioning of the money market and RTGS system.

An end-of-day facility is also provided to allow banks to borrow SGD funds from MAS via overnight repurchase transactions (repos) of SGS. The interest rate charged on the overnight repurchase transaction is 2% above the reference rate. The reference rate is the one-month SGD Sibor fixed by the Association of Banks in Singapore (ABS) at 11:00 Singapore time on the same working day.

To mitigate operational risks, MEPS deploys stringent front-end application user security mechanisms, digital signatures and encryption technologies to ensure the integrity, confidentiality and authenticity of the payment messages. Business continuity and disaster recovery plans are established and regularly tested for the MEPS host system as well as the participants' front-end systems. In addition, the MEPS host and participants' front-end systems are subject to periodic operational and technical audits by MAS' Internal Audit Department (IAD) and MAS' bank examiners respectively.

3.2.7 Pricing policies

Participating banks are charged on a cost recovery basis. A flat fee is charged for each MEPS message, payable by the bank initiating the message. There is no annual subscription fee or joining fee to participate in MEPS, and no additional charge for real-time current account balance enquiries.

3.3 Retail payment systems

3.3.1 Singapore Dollar Cheque Clearing System (SGDCCS)

The operator of the SGDCCS is Banking Computer Services Pte Ltd (BCS). Direct participation in the SGDCCS is available only to ordinary SCHA members. Other SCHA members can participate

indirectly in the SGDCCS using another participating bank as an agent bank. As at December 2000, there were 41 direct participants and 71 indirect participants in the SGDCCS.

The SGDCCS is a national cheque clearing system. It was automated in 1982 with magnetic ink character recognition (MICR) technology. In 1992, it was further enhanced with the establishment of the Electronic Clearing System (ECS). ECS facilitates the electronic transfer of cheque MICR data from banks to the SACH for processing.

The clearing system was further improved in 1997 when BCS launched the image clearing system. This system allows the image of the inward cheques to be captured on a CD-ROM and sent to the paying banks for verification. This process improves the efficiency of the inward cheque clearing operation. It currently takes one working day for a Singapore dollar cheque to be cleared and funds to be released to the payee.

The clearing and settlement process of a SGD cheque is as follows:

- (1) The payer sends a cheque to the payee.
- (2) The payee deposits the cheque at the presenting bank, which credits the payee's account provisionally ("on hold" cheques).
- (3) The presenting bank sends MICR information (ECS data) of cheques to the SACH. For banks sending ECS data, the corresponding physical cheques can be sent to the SACH later in the day.
- (4) After clearing the cheques and determining the net settlement amount for each participating bank, the SACH sends the net clearing figures to MEPS for broadcast and settlement.
- (5) The SACH processes and sorts the ECS data and physical cheques and these are available for collection by the relevant paying banks that evening.
- (6) If the paying bank rejects a cheque, it will return the unpaid cheques to the presenting bank through the SACH by 12:00 the next day.
- (7) The SACH will process the returned cheques and forward them to the respective presenting banks. The settlement amount for both paying and presenting banks will be adjusted accordingly by the SACH in the figure sent to MEPS that day.
- (8) If the cheque is cleared successfully, the payee can withdraw the "on hold" funds after 14:00 on the second business day.

The SACH will transmit the multilateral net positions of all direct and indirect participants to MEPS twice a day on weekdays and once on Saturdays. The cut-off time for transmission of ECS data to the SACH for midday clearing is 14:30 on weekdays (there is no midday clearing on Saturdays). Midday multilateral net settlement positions are broadcast across MEPS at 15:05 and banks have until 15:45 to fund any net debit positions, whereupon final settlement is effected. For end-of-day cheque clearing, there are two cut-off times for transmission of data to the SACH: one for non-ECS physical cheques at 16:00 and one for ECS data at 16:45 on weekdays (12:30 and 13:15, respectively, on Saturdays). End-of-day multilateral net settlement positions are broadcast across MEPS at 17:45 (14:05 on Saturdays) and banks have until 18:15 (14:30 on Saturdays) to fund any net debit positions, whereupon final settlement is effected.

A deposited cheque will accrue interest from the day it is deposited. However, cheques are not considered paid until the paying bank has had time to validate the cheque and the drawer's capacity to cover it. Paying banks will only notify presenting banks on an exception basis, ie only if the cheque has been dishonoured (see *points 6 and 7 above*). Generally, "cleared funds" are released at 14:00 the next business day.

3.3.2 US Dollar Cheque Clearing System (USDCCS)

The USDCCS was launched in 1996 to clear and settle US dollar-denominated cheques drawn on banks in Singapore. The system significantly reduced the time needed to clear a USD cheque from the previous two to four weeks to only three days. BCS and Citibank NA are the appointed clearing operator and settlement bank, respectively, for the USDCCS.

For the settlement of USD cheques, participating banks must maintain USD accounts with Citibank NA with minimum balances of USD 10,000.

The clearing and settlement process for USD cheques is as follows:

- (1) USD cheques are delivered to the SACH by presenting banks.
- (2) At the end of the first day, the SACH will generate a settlement statement to the settlement bank setting out the total credits and total debits of each of the participating banks.
- (3) The settlement bank then advises participating banks if there will be insufficient funds in their accounts with the settlement bank, based on a comparison of the total debit position against available funds in each participating bank's account. Participating banks are required to meet any projected shortfall.
- (4) The SACH processes and sorts the USD cheques and these are available for collection by the relevant paying banks on the second business day. Settlement occurs on the second business day across participating banks' accounts with Citibank NA, but the funds are not considered "cleared funds" until the end of day three.
- (5) All returned unpaid USD cheques are delivered to the SACH at the latest by the morning of the third business day.
- (6) The SACH processes the returned cheques and the relevant presenting banks collect them by noon on the third business day.
- (7) The customers can withdraw the proceeds after 14:00 on the third business day.

3.3.3 Interbank GIRO (IBG)

IBG is a paperless system that allows a customer of a participating bank to transfer funds, through direct debits and credits, to the accounts of customers of any participating bank. In July 2001, the SACH introduced the eGIRO system, which removes the manual delivery of magnetic tapes between the banks and the SACH by using secured electronic transmission of payment data. Under eGIRO, the entire process of clearing and settlement, including processing of returned and rejected items, can be straight through and automated.

The clearing and settlement process for IBG is as follows:

- (1) The first party sends the payment instructions to the originating bank.
- (2) The originating bank checks the credit limit of the first party (if it is a direct credit instruction) and sends the payment instructions to the SACH for clearing.
- (3) After determining the net settlement amount for each participating bank, the SACH sends the net clearing figures to MEPS for broadcast and settlement.
- (4) The SACH forwards the payment instructions to receiving banks for the credit/debit of the second party's account.
- (5) If the payment instruction is rejected, receiving banks will return the rejected instruction to the originating bank through the SACH the next day. The SACH will adjust the settlement amount for both banks before forwarding the rejected instruction to the originating bank.
- (6) If the collection (payment) is successful, a credit (debit) statement is generated for the first party and a debit (credit) statement for the second party.

There is one clearing and settlement session for IBG payment instructions on weekdays and one on Saturdays. Participants are required to send payment instructions to the SACH by 12 noon on weekdays and 09:00 on Saturdays. The SACH will send multilateral net settlement positions to MEPS for broadcast to all banks by 15:30 on weekdays and 12:15 on Saturdays; broadcasts at these times are for information only. The figures are broadcast again at 17:45 (14:05 on Saturdays) and banks have until 18:15 (14:30 on Saturdays) to fund any net debit positions, whereupon final settlement is effected.

3.3.4 ATM networks

Most banks in Singapore have proprietary ATM networks, but there are linkages between these networks providing consumers with wider access. There are currently two major ATM networks in Singapore:

- The POSB-DBS ATM network, which was established following the merger of POSB and DBS in 1998. This network is a proprietary-based network; and
- The ATMNETS network, a shared ATM service of the other two local banks (United Overseas Bank and Oversea-Chinese Banking Corporation).

For transactions using the ATMNETS network, the switching is done by NETS. When a cardholder performs a transaction at an ATM of another bank, NETS switches the transaction to the issuing bank for authorisation, which involves verification of the PIN, checking that sufficient funds are available and authentication of the transaction. The issuing bank then sends its response back via NETS, which switches it to the ATM being used, and the transaction is completed.

If cardholders perform transactions at their own bank's ATMs, these do not require any switching, as the issuing bank is able to approve them directly.

ATMNETS transactions are cleared by NETS. NETS calculates the multilateral net settlement positions for each member bank. The net amount is then provided to DBS for direct debiting/crediting of the member banks' accounts with DBS. Member banks then manage their nostro accounts at DBS through MEPS.

Cirrus and Plus transactions are cleared by Mastercard and Visa respectively on a similar principle to NETS. When currency conversions are necessary, the London interbank rate is used. Settlement for these transactions is conducted through the respective card schemes' settlement banks.

3.3.5 EFTPOS

NETS' EFTPOS service was publicly launched in 1986. Currently, NETS owns more than 20,000 EFTPOS terminals, with approximately 9,200 merchants in over 12,000 outlets.

EFTPOS transactions acquired on NETS terminals are routed to NETS for processing. The routing arrangements vary depending on the card type used in the transaction:

- For debit cards issued in Singapore, NETS dispatches the transaction for authorisation to the issuing bank. The issuing bank verifies the PIN, checks that sufficient funds are available, verifies that the transaction is not fraudulent, debits the cardholder's account and informs the merchant of the successful transaction, who in turn delivers the goods/services to the cardholder.

Debit card point of sale transactions are settled across accounts held with NETS' settlement bank, DBS. NETS clears local debit card and stored value card transactions and settlement occurs via debiting/crediting of the banks' accounts with DBS:

- NETS first performs multilateral netting to determine a net settlement amount for each member bank.
 - The net amount is then submitted to DBS for debiting/crediting of the member banks' accounts.
 - Member banks then manage their nostro accounts at DBS through MEPS.
- For Maestro cards and Amex and Diners charge cards, NETS routes the transaction to the respective card processor. The card processor, on behalf of the issuing bank, checks the payment limit, verifies that the transaction is not fraudulent and authorises the merchant to deliver the goods/services. Settlement for these transactions is conducted through the respective card schemes' settlement banks.

3.3.6 Main projects and policies being implemented - Cheque Truncation System

The Singapore Clearing House Association and the Association of Banks in Singapore are jointly developing a Cheque Truncation System (CTS) targeted for implementation in February 2003. The CTS is a cheque clearing system where electronic images of the cheques are captured at the point of deposit and transmitted throughout the entire clearing process. Physical movement of paper cheques will be reduced, resulting in a more efficient cheque clearing cycle.

4. Securities settlement systems

The securities market of Singapore comprises Singapore Government Securities (SGS), corporate debt securities, equities and derivatives products.

The two main providers of securities settlement systems in Singapore are MAS and the Central Depository (Pte) Ltd (CDP).

- (1) The MEPS-SGS subsystem at MAS clears and settles SGS trades on a DVP basis.
- (2) The CDP is the clearing house for Singapore equities, corporate debt securities and derivatives products and has the following systems for clearing and settlement:
 - Institutional Delivery Affirmation System (IDAS), which is used for custody and settlement of equities traded by institutional clients;
 - Debt Securities Clearing and Settlement System (DCSS), an electronic book-entry system for the custody and settlement of Singapore dollar statutory board and corporate debt securities; and
 - Clearing Operations and Risk Evaluation system (CORE), the clearing system for all derivatives contracts.

4.1 Singapore government securities

MAS acts as the agent for the Government of Singapore in issuing Singapore Government Securities (SGS), comprising treasury bills (T-bills) and government bonds. Maturities range from three months to 15 years with three-month and one-year benchmarks for T-bills and two-, five-, seven-, 10- and 15-year benchmarks for bonds. Since May 2000, MAS' issuance programme has aimed to build large and liquid benchmark bonds. This has been achieved through larger issuance of new SGS bonds and reopenings of existing issues, thereby enlarging the free float of SGS available for trading.

4.1.1 Trading

MAS issues T-bills and bonds on a regular basis. Three-month T-bills are issued weekly, whilst one-year T-bills and two-, five-, seven-, 10- and 15-year bonds are issued according to an annual issuance calendar, which is usually announced in September for the following year. The exact size of each T-bill and bond auction is typically announced a week ahead of the scheduled auction date. Auction announcements are made via MAS' website and major local newspapers. SGS are not listed on the Singapore Exchange and trading of SGS is done on an over-the-counter (OTC) basis.

SGS primary dealers play a critical role in the growth and development of the bond market by carrying out the following functions:

- (i) Providing liquidity to the SGS market by quoting two-way prices under all market conditions;
- (ii) Underwriting issuance at SGS auctions;
- (iii) Providing market feedback to MAS; and
- (iv) Assisting in the development of the SGS market.

There are 18 approved secondary dealers among banks, merchant banks and stockbroking firms. In addition, another 98 banks maintain book-entry SGS accounts with MAS for their own trading. Apart from the dealers and brokers, other market participants include finance companies, insurance companies, fund managers, corporations and individuals.

4.1.2 Pre-settlement

Trade confirmation is performed using the MEPS-SGS system. The bond seller keys in the agreed trade details into MEPS-SGS. The bond buyer confirms the same trade in the system. After confirmation, trades move into the settlement phase.

4.1.3 Settlement

The MEPS-SGS system holds government bonds and facilitates the instantaneous and irrevocable transfer of SGS and is linked to the MEPS system to provide DVP for SGS transactions. Under the scripless settlement system, crediting or debiting the securities owner's account through computerised book entries will effect any transfer of securities. The users of the system can choose either DVP-based or FOP-based settlement in the MEPS-SGS system. DVP settlement of SGS transactions occurs on an electronic basis over MEPS and MAS-SGS book-entry clearing system. FOP settlement involves a transfer of SGS without a corresponding funds transfer instruction.

The MEPS-SGS system opens at 09:00 daily to process SGS transactions with payments. Participating banks of MEPS need to maintain two accounts in the MEPS-SGS subsystem:

- *SGS-MLA account*
To maintain SGS for compliance with the MLA requirements.⁷
- *SGS-Free account*
SGS holdings in excess of the minimum MLA requirements are maintained in the SGS-Free account. SGS holdings in this account can be used for settlement.

Banks can only sell SGS in the SGS-Free account. Transfers of SGS from the SGS-MLA account to SGS-Free account can only be effected if the value of the remaining SGS in the SGS-MLA account is equal to or exceeds the prudential requirement of 10% of liabilities. If this prudential requirement is not met, the transfer is rejected by the system.

If the seller of SGS has insufficient SGS for delivery, the transaction is queued in MEPS until sufficient SGS are made available in the seller's SGS-Free account. When the seller's SGS-Free account has sufficient SGS, the SGS are earmarked for transfer to the buying bank and an IFT payment message is sent to MEPS.

If the buying bank has insufficient funds to pay for the SGS purchase, the payment is queued in MEPS. When the funds become available, the amount is debited from the buyer's RTGS account and credited to the seller's RTGS account. The MEPS-IFT subsystem will simultaneously notify the MEPS-SGS subsystem to transfer the securities to the purchasing bank. The settlement date convention for SGS transactions is T+1.

4.2 Corporate and statutory board bonds

4.2.1 Trading

There have been several landmark bond issues by supranationals and foreign corporates, as well as public sector statutory boards. In 2001, total Singapore dollar and non-Singapore dollar-denominated debt issuance was SGD 21.9 billion and SGD 58.7 billion, respectively. Trading of corporate and statutory bonds is done on an OTC basis.

4.2.2 Pre-settlement

Both the securities buyer and seller input settlement instructions, containing key details of the trade, into the Debt Securities Clearing and Settlement System (DCSS). Upon matching of the settlement instructions, the seller's debt securities are earmarked and the transaction proceeds on to settlement. Matched instructions can only be revoked by the buyer.

4.2.3 Settlement

DCSS commenced operations in 1998 and is an electronic book-entry system for the custody and settlement of Singapore dollar bonds, replacing the need for physical delivery of bond certificates. Bond transactions can be settled on a DVP or FOP basis. All exchange-listed corporate debt securities

⁷ Please refer to footnote 6.

transactions are settled on a DVP basis. Cash settlements for trades occur in MEPS. Funds are transferred via MEPS-IFT while securities are simultaneously transferred via the DCSS book-entry system on a gross trade-for-trade basis. A real-time DVP arrangement is achieved through a live leased line linkage between DCSS and MEPS. On a FOP settlement basis, the transacting parties use CDP only for securities transfer and arrange for funds transfer separately.

International central securities depositories (ICSDs) such as Euroclear and Cedel also participate in the Singapore securities market through their respective depository agents in Singapore. The ICSDs have indirect linkages with CDP through their depository agents, which facilitate clearing and settlement for international investors. Transactions can be settled on a DVP or FOP basis.

4.3 Equities

4.3.1 Trading

The Singapore Exchange (SGX), via its subsidiary Singapore Exchange Securities Trading Limited (SGX-ST), provides an electronic platform for the trading of equities. SGX-ST provides a market in a wide range of domestic and foreign securities that are traded on a scripless basis. As at end-March 2001, SGX-ST had 35 member companies and 47 non-member companies. Members and non-member companies are licensed as dealers by MAS under the *Securities Industry Act*. As at end-June 2001, there were 491 companies listed on SGX, with market capitalisation of SGD 361 billion.

All securities certificates are deposited with CDP, a subsidiary of SGX. Under the scripless settlement system, crediting or debiting the owner's account through computerised book entries will effect any transfer of securities. CDP operates as a central nominee and all deposited securities at the CDP are registered in its name. CDP holds the securities on the owner's behalf but it does not have any rights over them.

In December 2001, SGX and the Australian Stock Exchange (ASX) established an active electronic link between the two exchanges' trading and settlement systems. The link allows investors in Singapore and Australia to co-trade selected securities in each other's market directly, through brokers in their own countries, whenever the respective markets are open.

4.3.2 Pre-settlement

The clearing process begins with trade matching, which occurs immediately upon execution of the trade in the Singapore Exchange Securities Order Processing System (SESOPS), a fully automated trading platform. Once the trade is matched, CDP, through novation, becomes a counterparty to each side of the transaction, thus guaranteeing performance to the brokers on each side of the trade.

4.3.3 Settlement

Participants in the clearing and settlement framework

- *SGX member companies*
SGX member companies' participation in the system is compulsory.
- *Clearing members*
Only SGX member companies are clearing members of CDP.
- *Principals*
Principals are custodian banks approved by CDP to settle trades on a DVP basis for their clients. Participation is optional and is by application to CDP.
- *Settlement banks*
Settlement banks are selected by CDP to facilitate the funds settlement between CDP and the principals.
- *Clearing bank*
The clearing bank is appointed by CDP to settle funds transfer between principals' settlement banks and CDP.

- *International clearing agents*
International clearing agents such as Euroclear and Clearstream participate through their depository agents in Singapore.

The Institutional Delivery Affirmation System (IDAS) commenced operations in 1997 and is used to settle trades on a DVP basis. Trade settlement consists of two processes: trade affirmation followed by cash settlement. CDP acts as the central counterparty to each affirmed trade and ensures the delivery of securities against payment. Under the IDAS DVP rules, custodian banks must ensure that there are shares to meet delivery obligations before affirming the sale transaction. CDP is irrevocably authorised to debit the securities from the relevant sub-accounts of the custodian bank. The system earmarks the securities to be delivered by moving them from the “free” balance to the “available” balance. Securities in the “free” balance can be traded by the account holder, but securities in the “available” balance cannot be used by the account holder for any transaction.

Cash settlement in IDAS is on a net basis of all the affirmed purchase and sale transactions for a settlement day. The net paying settlement banks pay to the clearing bank and the clearing bank in turn pays the net receiving settlement banks on behalf of CDP with cash settlement finality at the end of T+3. Securities are debited from the “available” balance of the seller and credited to the “free” balance of the buyer on T+3 as well.

4.3.4 Risk management

All equities settlements in IDAS are performed on a DVP basis. CDP’s guarantee for DVP trades is supported by undertakings and bank guarantees by the various settlement agents. A settlement agent has to make payment on behalf of its clients once a trade is affirmed. If the settlement agent is unable to make payment on the due date, its settlement bank is obliged to make payment on its behalf. In the event that the settlement bank is unable to make payment to CDP, the clearing bank is obliged to make the required payment.

CDP has a Clearing Fund that is applied in the event a clearing member is unable to discharge its financial obligations to CDP or if CDP suffers any loss as a result of liquidating a clearing member’s position. In addition, SGX maintains a Fidelity Fund to compensate any person who suffers pecuniary loss through the defalcation of a securities market member or any of its directors or employees.

4.4 Derivatives

4.4.1 Trading

The trading of derivatives products is carried out on the Singapore Exchange through its subsidiary, Singapore Exchange Derivatives Trading Limited (SGX-DT). SGX-DT provides investors in Singapore with risk management and trading facilities, offering futures and options contracts covering interest rates, currencies, stock indices and energy. Trading is mostly done on the exchange’s Electronic Trading System (SGX ETS). All SGX-DT members may gain direct access to SGX ETS. Corporate non-clearing members, commercial associate members and individual non-clearing members must apply through clearing members. Institutions which are not members of SGX-DT may apply for direct access through an SGX-DT clearing member.

4.4.2 Pre-settlement

SGX Derivatives Clearing (SGX-DC), a subsidiary of SGX, is responsible for clearing of derivatives products. SGX-DC assumes the role of counterparty to all executed trades. Novation occurs as soon as a trade is matched in the SGX ETS system and transmitted to SGX-DC. As a consequence, all financial obligations arising from the transaction are guaranteed by SGX-DC.

4.4.3 Settlement

SGX-DC revalues all positions carried on clearing members’ books on a daily basis by margining and marking to the latest market prices. SGX-DC computes daily the amount which each clearing member had made or lost on trades executed that day and on open positions brought forward using the settlement price. Every clearing member’s margin requirements are subsequently recomputed.

At the end of each clearing cycle, credit/debit instructions are sent to SGX-DC's settlement banks to instruct them to credit/debit clearing members' accounts for mark to market profits/losses and margin calls. Upon receiving these settlement instructions, each settlement bank is required to confirm to SGX-DC within a stipulated time via SWIFT that they are able to carry out the instructions. Rules of the Exchange will be used to handle a situation where a settlement bank cannot provide confirmation to SGX-DC for any clearing member by the deadline.

4.4.4 Risk management

SGX-DC prescribes appropriate margin levels after considering the volatility of the contracts based on their historical prices and qualitative factors that may impact future volatility.

SGX-DC revalues (marks to market) all open positions on a daily basis. The main objective of marking to market is to limit the exposure of SGX-DC to price changes and not allow losses to be accumulated until maturity of the futures contracts to find that the counterparty clearing member is unable to meet its obligations.

4.5 The use of the securities infrastructure by MAS

The Singapore dollar (SGD) is managed against a trade-weighted basket of currencies of Singapore's major trading partners and competitors. MAS operates a managed float exchange regime for the SGD. In other words, there is no official peg for the value of the currency against any other currency or basket of currencies. Instead, it is allowed to fluctuate within an undisclosed policy band. The policy band is usually reviewed every six months to ensure it reflects the current underlying fundamentals of the economy. Regular review of the policy band allows MAS to continually assess the path of the exchange rate in order to avoid a misalignment in the currency value, and also gives MAS the flexibility to accommodate short-term volatility in the financial markets.

To smooth out short-term fluctuations and to avoid misalignment of the SGD exchange rate, MAS intervenes in the foreign exchange market from time to time. MAS usually engages in transactions that involve the sale or purchase of US dollars against the SGD. The policy band provides a certain amount of flexibility, which minimises the need for constant intervention. However, the buying and selling of US dollars against the SGD will have an impact on the liquidity in the banking system. To manage the liquidity in the banking system, MAS also conducts money market operations to ensure there is an appropriate level of liquidity in the banking system. The money market instruments used include foreign exchange swaps or reverse swaps, direct lending to or borrowing from banks, repurchase (repo) or reverse repurchase (reverse repo) agreements in Singapore Government Securities (SGS) and direct purchase or sale of SGS.

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List of abbreviations

BGC	Bank giro centre - <i>Bankgirocentralen BGC AB</i>
RIX	The Riksbank's central interbank payment system

Introduction

In terms of transaction volumes, the Swedish payment system is dominated by the giro systems, the Bankgirot system and the Postgirot system, which account for more than 71% of all non-cash transactions. A growing proportion of the transactions in both systems are initiated electronically - around 86% in terms of value - and both the Postgirot and the Bankgirot administer systems for credit transfers initiated electronically via the internet.

Bankgirocentralen, BGC AB (BGC), adopted a new clearing platform in 1999 for retail payments that will allow a full integration of all systems involved in the clearing and settlement cycle.

While the number of cheque transactions is now very low in Sweden, debit cards linked to bank accounts have gained in importance. Increasing automation is the main driving force, with the number of EFTPOS terminals in shops and at other points of sale increasing considerably over the past decade.

Sveriges Riksbank, the central bank of Sweden, owns and runs the RTGS system, RIX, which started operating in 1990. Since 1999 the RIX system has consisted of two parallel but separate systems: K-RIX for settlement in Swedish kronor and E-RIX for settlement in euros. Via E-RIX, the RIX system is linked to the ESCB's TARGET system.

Stockholmsbörsen AB, formerly OM Stockholmsbörsen, runs the Swedish stock exchange, the derivatives market and the new electronic inter-dealer exchange for government benchmark bonds. This same entity clears and acts as the central counterparty for derivatives transactions. Prior to 1998, the derivatives exchange and the stock exchange were two separate entities.

Stockholmsbörsen AB is part of an alliance of Nordic stock exchanges known as NOREX. The other members are the Copenhagen Stock Exchange, the Icelandic Stock Exchange and Oslo Börsen. Alliance members have a joint equity trading system and harmonised trading and membership rules.

The Swedish CSD, VPC AB (VPC), is a clearing organisation operating the SSS, called the VPC system. Equities, bonds and money market instruments are all dematerialised in the VPC system.

The Riksbank has two separate roles in the payment system: an oversight role and an operational role. The Riksbank was reorganised in mid-2000 in order to make the distinction between these two roles clearer. One result of the reorganisation is that the tasks and responsibilities associated with these roles have been assigned to two separate departments. The Financial Stability Department is responsible for the oversight role, while the Market Operations Department performs the operational functions.

1. Institutional aspects

1.1 The general institutional framework

1.1.1 *The institutions*

Sveriges Riksbank is the Swedish central bank. According to the Riksbank Act (*Lagen om Sveriges riksbank, 1988:1385*), the Riksbank shall promote a safe and efficient payment system. In order to achieve this, the Riksbank oversees and provides for the stability of the financial system and ensures the supply of banknotes and coin. The Riksbank also provides the central payment system, RIX.

The Riksbank's RIX system can be seen as the hub of the Swedish payment system. In addition to the Riksbank, the participants in the RIX system are the National Debt Office (handles government payments), credit institutions and the clearing houses: VPC (which clears and settles equities, bonds and money market instruments), Stockholmsbörsen (which clears and settles derivatives) and BGC (which clears and settles retail payments).

Finansinspektionen is the single Swedish financial supervisory authority. Finansinspektionen is responsible for the supervision of companies operating in the insurance, credit and securities markets, including the supervision of all clearing organisations.

The Ministry of Finance is the Swedish government office responsible for, inter alia, legislation regulating the financial sector (credit institutions, securities firms, funds management, stock exchanges, clearing houses and insurance companies).

1.1.2 **The legal framework for the payment and settlement systems infrastructure**

The principal laws forming the legal framework for the payment and settlement systems infrastructure are listed and described briefly below:

- The Sveriges Riksbank Act (*Lagen om Sveriges riksbank, 1988:1385*). This Act states that the Riksbank shall, inter alia, “promote a safe and efficient payment system”. The Riksbank may provide settlement system facilities and participate in the settlement of payments. It may also grant intraday credit to participants in the system against adequate collateral. A credit institution or any other company supervised by Finansinspektionen has an obligation, upon the request of the Riksbank, to provide the Riksbank with such information as the Riksbank considers necessary in order to ensure the stability of the payment system.
- The Settlement Systems Act (*Lag om system för avveckling av förpliktelser på finansmarknaden, 1999:1309*). This Act is based on the EC Directive on settlement finality in payment and securities settlement systems.¹ It governs the registration and approval of systems used for clearing and settling transactions with financial instruments.
- The Exchange and Clearing Operations Act (*Lag om börs- och clearingverksamhet, 1992:543*). This Act regulates the authorisation of exchanges or markets in which financial instruments can be traded. Clearing services can only be provided by Sveriges Riksbank or by institutions which have been authorised in accordance with this Act. Finansinspektionen is commissioned to grant this authorisation after a written procedure with the Riksbank.
- The Financial Instruments Accounts Act (*Lag om kontoföring av finansiella instrument, 1998:1479*). This Act regulates the registration of ownership of both dematerialised financial instruments and those material instruments which have been taken out of circulation. The responsibility for maintaining the ownership register is assigned to a CSD, which is granted authorisation by Finansinspektionen.
- The Trading in Financial Instruments Act (*Lag om handel med finansiella instrument, 1991:980*). This Act specifies the disclosures to be made, the information to be provided and the procedures to be followed when transactions with securities are undertaken. It also lays down a netting provision regarding contracts involving financial instruments. The Act is based on the EC Directive on public offers.²
- The Securities Operations Act (*Lag om värdepappersrörelse, 1991:981*). This Act provides the licensing requirements for securities firms and guidelines governing the supervision of such firms and the types of business in which such firms may engage. The Act is based on the EC Directive on investment services.³
- The Banking Business Act (*Bankrörelselagen, 1987:617*). This Act regulates the business which a bank may conduct, the prudential supervision of banks, the requirements for obtaining a banking licence and the requirements in respect of confidentiality, auditing, etc.
- The Financing Operations Act (*Lag om finansieringsverksamhet, 1992:1610*). This Act establishes the licensing requirements, the sound operations requirements, the operating regulations and the prudential regulations for institutions engaged in financing operations.

¹ Directive 98/26/EC of the European Parliament and of the Council of 19 May 1998 on settlement finality in payment and securities settlement systems.

² Council Directive 82/298/EEC coordinating the requirements for the drawing-up, scrutiny and distribution of the prospectuses to be published when transferable securities are offered to the public.

³ Council Directive 93/22/EEC of 10 May 1993 on investment services in the securities field.

- The Companies Act (*Aktiebolagslagen, 1975:1385*). This Act regulates public limited companies and shareholdings and is applicable to the above-mentioned financial institutions.
- The Act on Cross-Border Payments within the EEA (*Lag om betalningsöverföringar inom Europeiska ekonomiska samarbetsområdet, 1999:268*). This Act is based on the EC Directive on cross-border credit transfers⁴ and covers payments from individuals or legal entities in Sweden to individuals or legal entities in another EEA country, as well as payments from payers in an EEA country to payees in Sweden. The Act covers payments up to the amount of EUR 50,000.
- The Act on Fees on some Cross-Border Payments (*Lag om avgifter för vissa gränsöverskridande betalningar, 2002:598*). This Act is based on the EC Regulation⁵ on cross-border payments in euros. The Regulation can also apply to cross-border payments made in the currency of another member state, as has been decided in Sweden.
- The Deposit Guarantee Act (*Lag om insättningsgaranti, 1995:1571*).
- The Act on Measures against Money Laundering (*Lag om åtgärder mot penningtvätt, 1993:768*).
- The Act on Capital Adequacy and Large Exposures concerning Banks and Securities Firms (*Lag om kapitaltäckning och stora exponeringar för kreditinstitut och värdepappersbolag, 1994:2004*).
- The Act on Foreign Exchange Transactions and Payment Transfers (*Lag om valutaväxling och betalningsöverföring, 1996:1006*).
- The Cheque Act (*Checklagen, 1932:131*).
- The Consumer Credit Act (*Konsumentkreditlagen, 1992:830*).
- The Bankruptcy Act (*Konkurslagen, 1987:672*).

1.1.3 The Swedish banking sector

At the end of March 2002 there were 127 banks in Sweden. These banks can be divided into two categories: commercial banks, including branches of foreign banks, and savings banks. The Banking Business Act contains general provisions which apply to banks in the form of limited companies as well as to traditional savings banks.

Commercial banks dominate the banking sector, as most of the larger savings banks and all cooperative banks have merged and/or been transformed into commercial banks. In March 2002 more than 97% of total banking sector assets were held by commercial banks. The remaining 3% were distributed among 77 independent savings banks, most of them very small and locally oriented. Consequently, these banks play a very marginal role in the Swedish banking and payment system.

The banking sector is highly concentrated, with the four largest commercial banks (SEB, Handelsbanken, Nordea and FöreningsSparbanken) accounting for almost 56% of household lending, almost 77% of corporate lending and an even higher percentage of payment activities. In addition to being the major counterparties in the RIX system, these four large banks are also the majority owners of BGC and VPC.

Foreign banks are allowed to operate in Sweden through branches as well as subsidiaries. At the end of March 2002 there were 23 foreign banks represented on the Swedish market, 21 through branches and the other two through subsidiaries. The foreign banks accounted for around 13% of both household and corporate lending. This share has increased rapidly over the past few years.

In recent years there has been intense and sometimes indignant public debate about the banks' pricing policy, which is clearly aimed at introducing specific charges for various services in place of

⁴ Directive of the European Parliament and of the Council of 27 January 1997 on cross-border credit transfers (97/5/EC).

⁵ Regulation of the European Parliament and of the Council of 19 December 2001 on cross-border payments in euro (2560/2001).

float financing. This pricing strategy is also an important part of the banks' aim to encourage customers to make their payments via the internet or other electronic media.

1.2 The role of the central bank

1.2.1 General responsibilities

Statutory responsibility

With the exception of its explicit and exclusive mandate to issue banknotes and coin, the Riksbank's responsibilities in respect of the payment system and its various components are formulated in general terms in the Riksbank Act. For example, the Riksbank's role as an overseer of the payment system does not include any formal obligation to provide settlement services to the banks, but allows for this possibility. The Riksbank does indeed provide interbank settlement facilities for banks, the government and a few other financial institutions through the RIX system, as well as providing deposit and credit facilities.⁶ Via their accounts in the RIX system, the participants can borrow against collateral both intraday and overnight: intraday to ensure a smooth flow of payments, or overnight in the context of monetary policy.⁷

Oversight

The Riksbank's interpretation of its oversight responsibility⁸ can be described as being based on the following three aspects of the payment system:

- infrastructure
- central companies and institutions
- regulations

The Riksbank's oversight of the financial infrastructure *covers instruments of payment and technical and administrative systems that enable flows of financial assets between different institutions and marketplaces.*

The primary objective of the Riksbank with regard to the payment system - as both overseer and operator - is to identify, manage and limit systemic risks. These risks arise primarily in connection with the transfer of large-value payments between banks and other financial institutions. Therefore, from a financial stability perspective, the interest and activities of the Riksbank are concentrated on this aspect of the payment system. Subsequently, the oversight is focused on systemically important payment systems, ie the RIX system, the VPC and Stockholmsbörsen.

Retail payment systems are, however, also included in the Riksbank's oversight responsibilities, particularly those systems directly linked to RIX. In the field of retail payments the Riksbank pays particular attention to questions of efficiency in order to encourage the adoption of efficient payment solutions.

In performing its duties as an overseer, the Riksbank meets on a regular basis with different groupings of actors in the Swedish payment system. Individual meetings are held on a regular basis with the major banks, the Swedish Bankers' Association and the clearing organisations. The Riksbank can propose new laws and changes to existing laws directly to parliament, and is also asked to comment on new laws and various official reports. In addition to these activities, the Riksbank takes part in public debate on issues relating to payment systems. One important tool in the oversight activities of the Riksbank is the publication of the semiannual Financial Stability Report.

⁶ For more information about the participants' access to the Riksbank's deposit and credit facilities, see Section 3.2.2.

⁷ The Riksbank is allowed to grant intraday credit in euros, but not overnight credit.

⁸ The Riksbank's objectives and tasks with respect to the oversight of the financial infrastructure have been published in the Sveriges Riksbank Economic Review 2001:3.

The provision of an interbank settlement system

The rules and regulations to be followed by the participants in the RIX system are laid down in the Rules and Regulations for Payment Settlement in RIX (see Section 3.2.1) and in the agreements which the participants conclude with the Riksbank in its capacity as holder of accounts and owner of the system. Each participant enters into three different agreements with the Riksbank: an accession agreement, an agreement on credit and deposits and, finally, a pledge agreement for credit in RIX.

1.2.2 Ongoing work

The Riksbank takes part in various international committees and working groups, primarily organised by the BIS and the ECB, the activities of which are related to payment and securities settlement systems issues, such as the Committee on Payment and Settlement Systems and the Payment and Settlement Systems Committee.

During autumn 2000 the Riksbank initiated a domestic Payment Systems Committee, *Betalningssystemrådet*, consisting of executive representatives from the larger banks and clearing and settlement organisations in Sweden. This Committee is intended to serve as a forum for the discussion of payment systems issues at a general policy level.

In addition to the Payment Systems Committee, the Riksbank has set up a number of user groups and working groups which provide a medium for exchanging information with participants and for continuing with the development of the RIX system.

1.3 The role of other private and public sector bodies

Finansinspektionen

Finansinspektionen is the single Swedish financial supervisory authority. Finansinspektionen is responsible for the supervision of companies operating in the insurance, credit and securities markets. This includes the supervision of all clearing organisations, except for the RIX system, which is operated by the Riksbank. Contributing to the stability and efficiency of the Swedish financial sector is part of Finansinspektionen's overall objective. Finansinspektionen reports to the Ministry of Finance.

The Swedish Bankers' Association

In the private sector, the Swedish Bankers' Association, *Svenska Bankföreningen*, has standing committees which discuss and coordinate the banks' approaches to issues concerning the processing of payments and the technical aspects of payment systems. Within the framework of the Swedish Banker's Association, the participants enter into agreements with one another about cutoff times and the processing of payments in the RIX system. The Association is also owner of one of the retail payment systems in Sweden, the Data Clearing System, which is operated by BGC.

In the public sector, there are a number of authorities in addition to the Riksbank which are involved in various aspects of the payment system. These are as follows:

The Swedish Competition Authority

The Swedish Competition Authority, *Konkurrensverket*, was founded in 1992 and a new Competition Act came into force on 1 July 1993. This Act is based on the competition rules of the European Community and has two prohibitions, one against anticompetitive price collusion, the other against the abuse of a dominant position. It also contains provisions regarding merger control. The prohibition against anticompetitive price collusion has in some cases led to changes in the pricing of different retail payment services.

The Swedish Consumer Agency

The Swedish Consumer Agency, *Konsumentverket*, is the government agency responsible for consumer protection in all areas, including payment systems. In practice, the agency's role in the payment systems field mainly concerns the debit and credit card sector, where guidelines have been formulated and negotiated with the card-issuing companies.

The Swedish National Debt Office

The Swedish National Debt Office, Riksgäldskontoret, is an agency reporting to the Ministry of Finance and is responsible for managing the national debt. The National Debt Office participates in the RIX system as the government agency responsible for the processing and management of government payments.

2. Payment media used by non-banks

2.1 Cash payments

Cash payments still account for a very large share of total payment transactions in the Swedish economy, although there are no firm statistics available to determine the precise figure. The ratio of the outstanding stock of banknotes and coin to GDP is about 4%.

The availability of cash has increased over the past decade as a result of the growing number of ATMs, from 2,221 in 1991 to 2,617 in 2000. Although there are two different brands of ATM, there is only one network in the sense that the underlying systems - some of which are proprietary, while others are owned collectively by a group of banks - are linked to one another. Individuals can thus make withdrawals, without charge, at any branch of any bank or at any ATM, irrespective of the bank at which the account is held.

In 1999 the Riksbank decided to delegate its operational involvement in the distribution of banknotes and coin throughout the country to a wholly owned separate subsidiary called Pengar i Sverige AB (PSAB). This decision was made on the basis of efficiency considerations. It was felt that costs arising from cash distribution could be cut in a number of areas, but that such cost reductions were more likely to be pursued by a profit-driven enterprise than by a public entity. PSAB is not restricted to doing business only with the Riksbank, and recently entered into an agreement with a Swedish bank to take over part of that bank's internal distribution and the counting and handling of banknotes and coin. However, the Riksbank has supervisory authority over PSAB. It also retains its overall oversight responsibility for the market for cash payments. This refinement of roles - operational versus oversight roles - is also expected to contribute to the realisation of efficiency gains. Furthermore, the Riksbank recently decided to divide PSAB into two companies at the beginning of 2003 in order to further enhance efficiency. Business that is exposed to competition will be organised in one company, which is to be sold.

2.2 Non-cash payments

2.2.1 Credit transfers

The bulk of non-cash payment transactions by companies and households are made through the two giro systems, the Postgirot and the Bankgirot. The two giro systems play a dominant role in the Swedish payment system, covering a wide range of transactions for both households and companies; the vast majority of Swedish enterprises and organisations hold accounts with both systems. Giro services are generally included in the package of services which banks offer their customers - households and enterprises alike - when they hold a bank account. In 2000 these two systems for credit transfers together accounted for 71% of all non-cash transactions. In value terms, around 86% of these transactions were generated electronically, while the remainder were paper-based.

The Postgirot system is an in-house system for credit transfers between accounts held at the Postgirot Bank. A total of 454 million transactions were carried out in 2000, which in aggregate amounted to SEK 4,086 billion (USD 391 billion) in value terms. The Postgirot Bank was recently purchased by Nordea.

The Bankgirot system is a network for credit transfers between accounts held at the commercial banks. Funds are transferred between bank accounts by means of a giro number, which is not an account number but an address indicating a bank account. The Bankgirot is also an open interbank system for the processing of payments and payment information, ie a clearing house for retail

payments. The four major Swedish banks, together with four smaller banks, through BGC collectively own the system. However, after its purchase of the Postgirot Bank, the Swedish Competition Authority required Nordea to reduce its ownership in BGC from 27% to 10%. In 2000 the Bankgirot handled around 351 million transactions with a total value of SEK 3,733 billion (USD 357 billion).

A growing proportion of transactions in both systems are initiated electronically; as might be expected, this tendency is more pronounced for large-value transactions. Enterprises and organisations now submit their payment orders almost exclusively by electronic media, while households more frequently send their written payment orders by mail. However, even households are increasingly submitting their payment orders electronically by means of internet-based banking services. Both the Bankgirot and the Postgirot administer systems which can be used for credit transfers initiated electronically via the internet.

A number of credit transfers also go directly from bank account to bank account without the use of a giro number. These are channelled by the Data Clearing System, which was originally developed for cheque truncation. The Data Clearing System is also used when more rapid retail payment transfers are required. Account numbers and payment messages are transferred in accordance with a standardised format, which allows for straight through processing (STP). The Data Clearing System is owned by the Swedish Bankers' Association, but operated by BGC. Despite its name, the Data Clearing System is not a separate system but is completely integrated in BGC's technical platform. In 2000 a total value of SEK 1,348 billion (USD 129 billion) was transferred through the Data Clearing System.

2.2.2 Cheques

In recent years the number of cheque transactions has decreased substantially. Two million cheque transactions were conducted in 2000, with a total value of SEK 22 billion (USD 2.1 billion). There are a number of possible explanations for this development. One is the growing number of ATMs, which have made cash more easily available at any time of the day, thereby reducing the need for cheques as a payment instrument. A second reason is the growing importance of various EFTPOS systems, which, from a practical point of view, should make payment by card more attractive. A third factor, and probably the most significant, is the fact that Swedish banks have implemented a clear policy of reducing the number of cheque payments, because these are considerably more costly than alternative means of payment, such as card payments. To this end, one of the major banks introduced a rather high charge on all cheque transactions at the beginning of the 1990s. The other banks subsequently followed this example and also imposed heavy fees, with the result that the use of cheques has been drastically reduced.

In Sweden, all cheques are truncated, that is, the bank at which the cheque is cashed retains the physical document and the information is transmitted by electronic media to the drawee bank. The cheques are truncated in the Data Clearing System mentioned above. All cheques can be cashed at any bank branch irrespective of the bank on which they are drawn.

2.2.3 Direct debits

Direct debits, called *autogiro* in Sweden, still account for a rather limited share - around 8% - of the total number of non-cash transactions, although their importance is growing. Both the Postgirot and the Bankgirot systems provide direct debit services. The reasons behind the modest growth in the use of direct debits have yet to be examined. Swedish consumers may be reluctant to use a system where they have the feeling that they are losing control over their payments, although this is an unfounded fear. Another reason might be that the low prices for alternative payment methods mean customers have no incentive to use direct debits. Alternatively, banks may not have marketed the product effectively.

2.2.4 Credit and debit cards

The use of cards as payment media has increased gradually over time. From the available statistics it is fairly evident that traditional credit cards have never played a significant role in the Swedish payment system, and, moreover, that their significance has diminished over the past few years.

Instead, debit cards have gained in importance, most notably those debit cards linked to bank accounts. Such debit cards usually combine several functions: those of a debit card for EFTPOS as

well as paper-based transactions, an ATM card for cash withdrawals, and a credit card, to the extent that the bank account to which the card is linked has an overdraft facility attached to it. In addition, these cards are usually provided with a link to international card systems such as Visa or MasterCard, which also makes them useful for international travel.

A rapid structural transformation is taking place in the area of retail payments, with increasing automation as the main driving force. One important indicator of this transformation is the fast-growing number of EFTPOS terminals in shops and other points of sale. The number of terminals operated by the banks rose from 6,100 in 1990 to 87,133 in 2000. The number of EFTPOS transactions increased by more than 1,400% during this period.

Another development in this field has been the growing importance of various retailer cards over the past decade. The volume and value of transactions using these cards have risen considerably, as has the number of issuers. The growing importance of retailer cards in recent years can be partly explained by the technical development mentioned above; card payments have become cost-effective from the retailer's point of view and they eliminate the risk of theft and robbery associated with the handling of large volumes of cash. Retailer cards also open up new channels for marketing vis-à-vis customers.

2.2.5 Prepaid cards

There is one card-based scheme in operation - the Cash card - which is issued by three of the major Swedish banks. All three banks use the same Proton technology, but continue to compete with one another by issuing their own bank-specific Cash cards. Interoperability is ensured as all cash terminals accept cards issued by any of the four banks and all loading terminals can be used by cardholders regardless of the identity of the issuing bank.

A pilot scheme was initiated at the end of 1996, with the national rollout of the system taking place in 1998. In accordance with the results of the first evaluations of market responses, the banks decided to abandon the Cash card as a standalone product and to include the e-money application in the traditional bank cards, so-called multifunctional cards. In 2000, 2.9 million transactions were carried out with the Cash card with a total value of SEK 160 million (USD 15.3 million). The corresponding numbers for 2001 were lower, 1.5 million and SEK 76 million (USD 7.3 million). The average number of transactions per month increased by 84% between 1998 and 1999 but dropped by 31% in 2000 and by almost 50% in 2001. It is still too early to say whether Cash cards are likely to gain widespread acceptance, but acceptance among customers has been rather low up to now. Retailers, however, have been receptive to the scheme, and there are currently 47,000 terminals that accept Cash card payments.

2.3 Recent developments

Internet banking has expanded very rapidly in Sweden. All banks offer internet services, which include access to account information as well as the possibility of carrying out transfers between accounts, bill payments and online securities trading. According to banking statistics, 20-25% of the private customer base has begun to use online banking services on a regular basis.

Bill payments still account for the largest proportion of online activity and the four largest banks have also begun to offer online bill presentment. There are two systems. However, there is an agreement in place for linking the two schemes and making them interoperable. Mobile phone banking is the next stage of online banking development. Some of the banks have already begun to offer mobile phone banking services to their customers. Pilot projects for initiating and making payments by mobile phone also exist outside the banking sector. Independent actors too are launching activities in this field on the Swedish market.

These trends may have some bearing on the future of the giro system in Sweden. It is now possible for private customers to initiate their bill payments electronically, and this may mean that the share of credit transfers initiated electronically will increase dramatically in the future. Furthermore, transfers between accounts at different banks have become easier as a result of online banking.

3. Interbank exchange and settlement systems

3.1 General overview

The RIX system, the settlement system owned and operated by the Riksbank, is the hub of the Swedish payment system. The system, developed during 1988-90 and implemented in 1990, operates on an RTGS basis. The RIX system settles payments in both Swedish kronor and euros. Until 31 December 1998, the system was used exclusively for Swedish kronor. Even though Sweden is not fully participating in EMU, the RIX system was adjusted to handle euro payments as well when the member states participating in EMU introduced the euro as a common currency on 1 January 1999. The RIX system therefore consists of two parallel but separate systems, K-RIX for settlement in Swedish kronor and E-RIX for settlement in euros.

The two main systems for retail payments are the Postgirot and Bankgirot systems. The Postgirot is essentially an in-house system for credit transfers between accounts held at the Postgirot Bank, recently purchased by Nordea. It handles payments ranging from low-value payments to and from households and firms to large-value government payments. The Bankgirot is an ACH managed by Bankgirocentralen (BGC) and owned by the banks. It is an open payment system in which customers can transfer payments from an account with one bank to an account with another bank. The Bankgirot system mainly handles retail payments, but also processes certain large-value payments. Bankgirot payments are settled on a bilateral net basis in the RIX system.

3.2 RIX

3.2.1 Rules of the system

Via E-RIX, the RIX system is linked to the ESCB's TARGET system. The rules for the TARGET system are issued by the ECB. On the basis of the ECB's TARGET Guideline⁹ and the multilateral agreement on TARGET¹⁰ concluded between the ECB and the NCBS of the European Union, the Riksbank has implemented the provisions of the Guideline and the multilateral agreement at the national level. The national regulation for Sweden is stated in the "Rules and Regulations for settlement of payments in RIX". Rules for the settlement of payments in Swedish kronor, which takes place in K-RIX, are also included in these rules and regulations.

There are three agreements between the Riksbank and the participant: (a) an accession agreement, (b) an agreement on credit and deposits, and c) a pledge agreement for credit in RIX. The agreements are appended to the "Rules and Regulations for settlement of payments in RIX", which are publicly available.

3.2.2 Participation in the system

The Riksbank owns and operates the RIX system. In order to be a participant in the RIX system, an institution must be authorised by the Riksbank. The RIX system is open to the following categories of institutions:

- credit institutions;¹¹
- investment firms (provided that they are permitted to trade in financial instruments or to provide guarantees in connection with issues of securities, and are counterparties in the Riksbank's money market operations);

⁹ Guideline of the European Central Bank of 26 April 2001 on a Trans-European Automated Real-time Gross settlement Express Transfer system (TARGET Guideline) (ECB/2001/3).

¹⁰ Agreement on a Trans-European Automated Real-time Gross settlement Express Transfer system (TARGET Agreement).

¹¹ According to the EU definition, which includes a number of institutions that are regarded as investment firms according to Swedish legislation.

- clearing organisations; and
- government agencies (which are responsible for central government payments and cash management).

The RIX system is open to remote access participants, and the Riksbank may also accept a foreign central bank as a participant in K-RIX. Participation in E-RIX is restricted to institutions which have their head office or a branch within the EEA.

In addition to the harmonised rules for the national payment systems in TARGET, each institution needs to fulfil certain prerequisites to participate in the RIX system, such as having sufficient technical, administrative and financial capacity in order not to cause disruptions in the RIX system. The institutions must also have access to SWIFT.

In mid-2002 K-RIX had 20 participants, including the Riksbank. Of these, 14 were banks, including six branches of foreign banks. The other institutions were BGC, VPC, Stockholmsbörsen and the Swedish National Debt Office. A mortgage institution, SBAB, became a participant in 2000 and one foreign credit institution has been accepted as a remote access participant in K-RIX. The foreign credit institution will become a participant in K-RIX in 2003.

In addition to the Riksbank, 14 of the participants in K-RIX also participated in E-RIX. Of these, 10 were banks, three of which were branches of foreign banks. The other institutions were BGC, VPC, Stockholmsbörsen and the Swedish National Debt Office.

Participants which are members of both K-RIX and E-RIX have two separate accounts, one for each currency. A credit facility can be attached to the accounts of participants which are credit institutions, securities firms or government agencies.¹² The Riksbank can grant intraday credit and overnight credit in Swedish kronor. The Riksbank's capacity to provide participants with credit in euros is, however, limited to intraday credit of a total amount of EUR 500 million (USD 463 million). Remote participants can have an intraday facility in Swedish kronor, but not in euros.

Participants can make payments on behalf of other institutions, and some smaller banks use this type of arrangement. For instance, most savings banks use FöreningsSparbanken (Swedbank), which acts as their clearing bank in the RIX system.

3.2.3 Types of transaction handled

The RIX system is used to settle interbank and customer payments. Payments arising from the Riksbank's own transactions with participants, primarily the trading of securities or currencies and the deposits and withdrawals of Swedish banknotes and coin, are also settled via the RIX system.

An individual payment can be registered and subsequently settled at any time during the operating hours of the system. From the point of view of the Riksbank, there is no minimum amount for the settlement of individual payments. However, under an agreement between the participants in the K-RIX system, the minimum amount for individual payments, such as interbank payments and customer-related payments, is currently SEK 0.5 million (approximately USD 50,400). Payments below this amount are aggregated and settled at predetermined times.

Bilaterally aggregated payments are divided into the following three categories:

- foreign payments (settlement of the SEK leg of payments to/from abroad which are to be forwarded to another bank in Sweden);
- data clearing (settlement of customer payments between banks relating to transfers, the cashing of cheques and bank drafts, and card payments); and
- BGC settlements (settlement of Bankgirot transfers, settlement of notes and coin, etc).

For each category, settlement takes place on one or several occasions per day.

¹² A government agency can only be granted intraday credit. A clearing organisation cannot be granted either intraday or overnight credit.

The clearing and settlement organisations VPC and Stockholmsbörsen net the payment obligations multilaterally between the participants in the RIX system. The participants are responsible for sending payments prior to the agreed cutoff times and ensuring that sufficient liquidity is available on their accounts at that time. VPC and Stockholmsbörsen are responsible for the execution of the settlement. BGC's settlement of cash transaction withdrawals at ATMs is also carried out on a multilateral net basis.

For the settlement of aggregated payments, the related payment messages for the individual transactions are transmitted separately outside the RIX system via SWIFT or BGC.

In E-RIX, the participants can send cross-border and domestic payments in euros. The majority of the payments in euros are cross-border, transmitted via TARGET to the NCB with which the receiving bank has an account. Customer-related payments are rarely sent via the E-RIX system, since the Swedish banks primarily use the Euro Banking Association's Euro 1 system for customer-related payments.

3.2.4 Operation of the transfer system

The RIX system, which was implemented in 1990, operates on an RTGS basis. This means that payments are settled one by one, on a continuous basis, and that the funds, which are immediately transferred to the participants' accounts at the Riksbank, are available for new payments whenever the system is open.

The RIX system operates on a mainframe computer and is developed, owned and operated by the Riksbank. The Riksbank runs the central computer system, and the RIX participants use their own equipment in their respective offices.

Communication via the RIX system is based on the SWIFT messaging system (see also Section 3.2.5).

The RIX system has a queuing function, which stores the participants' payments in a queue when there is insufficient liquidity. The payments are settled automatically when liquidity is available. This function applies the first in, first out (FIFO) principle, ie the first payment in the queue is settled first. RIX participants can depart from the FIFO principle by changing the order of the payments in the queue.

Net settlement transactions referred to VPC and Stockholmsbörsen are processed in separate queues and are settled at agreed cut-off times.

Participants can keep track of their transactions and the status of their Riksbank accounts at all times via a dedicated, encrypted online connection.

The opening hours for K-RIX are from 7 am to 5 pm each working day. The opening hours for E-RIX are from 7 am to 6 pm every day except for Saturdays, Sundays and a few public holidays when TARGET is closed.

3.2.5 Transaction processing environment

As mentioned above, communications via the RIX system are made by means of the SWIFT messaging system. Since 1998 the RIX system has used a SWIFT service called SWIFT Fincopy which stores payment messages and forwards them to the recipient once settlement has been made. The messaging technology allows participants to send payment instructions directly from their own systems. Payments can be processed automatically, which facilitates the continuous settlement of payments throughout the day.

If a bank suffers a disruption, it can manually enter transactions into the RIX system via RIX online. It is also possible to fall back on the Riksbank's former online system for sending and receiving payments in case of a disruption in the SWIFT network or the communication system.

The Riksbank has backup computer facilities located at physically separate sites of operation. Communications to the computer facilities are duplicated and all production data are updated in real time. If a breakdown in operations should occur, a transfer to the RIX backup system can take place within two hours.

3.2.6 Settlement procedures

As mentioned in Section 3.2.3, the participants in K-RIX have agreed on a certain settlement schedule for bilaterally and multilaterally aggregated payments, while the settlement of individual payments, such as interbank and customer payments, can take place whenever the system is open. E-RIX has only a few cutoff times for the settlement of aggregated payments.

3.2.7 Credit and settlement risk

The RIX system is an RTGS system. Since there is no delay between the system's acceptance of a payment and final settlement, the credit exposure is eliminated. Furthermore, the system does not send a message to the receiving bank until settlement is final. There is therefore no possibility for the receiving participant to credit its customer before final settlement.

The assets used to effect settlement in the RIX system comprise central bank money, which carries no liquidity or credit risk.

To avoid the possibility of liquidity shortage in the system, the participants are allowed to borrow intraday liquidity. Since 1 January 1995 full collateral has been required for both intraday and overnight borrowing.¹³

Collateral is marked to market daily, and both initial margin and haircuts are used as risk control measures. The qualification requirements for securities used as collateral include rating and listing requirements. Neither collateral issued by banks nor collateral issued by an entity with close links to the participants is accepted. Collateral, in the form of a pledge, can be held at the domestic CSD, VPC, at Euroclear or at the Danish and Norwegian CSDs, with the respective central bank acting as counterparty.

It is possible for a participant to change the amount of collateral within a short period of time during the day. This procedure is fully automated with regard to collateral held at the domestic CSD.

Separate rules for collateral apply in part to credit in euros. Credit in euros is not available to remote participants.

3.2.8 Turnover

During the first three quarters of 2002 the number of transactions in the K-RIX system averaged around 4,200 per day, with a daily turnover of about SEK 450 billion (USD 45,3 billion). The average amount of collateral was about SEK 70 billion (USD 7.1 billion). The number of transactions has increased during the last year. The main reason for this increase is that larger payments in the foreign clearing process are settled individually rather than in the aggregated settlement.

The number of transactions in the E-RIX system averaged around 300 payments sent and about 600 received per day at the beginning of 2002, and the daily turnover of payments sent was some EUR 5.5 billion (USD 5.1 billion).

3.2.9 Pricing

The Riksbank's pricing policy for the RIX system operates under three restrictions:

- to minimise risk and unwanted behaviour by participants,
- to attain full cost recovery, and
- to promote fair competition.

The price list below shows the fees for participation in the RIX system in 2002:

¹³ The Riksbank can grant intraday and overnight credit in Swedish kronor, but only intraday credit in euros.

Fees in 2002	K-RIX		E-RIX	
Annual fees				
Participants	SEK 200,000	(USD 20,155)	SEK 290,000	(USD 29,224)
Clearing houses	SEK 150,000	(USD 15,116)	SEK 240,000	(USD 24,186)
Transaction fees for domestic payments				
1-420 payments/month	SEK 9	(USD 0.91)	SEK 9	(USD 0.91)
421-10,000	SEK 3	(USD 0.30)	SEK 3	(USD 0.30)
10,001+	SEK 1	(USD 0.10)	SEK 1	(USD 0.10)
Transaction fees for TARGET payments				
1-100 payments/month	–		€1.75	(USD 1.62)
101-1,000	–		€1.00	(USD 0.93)
1001+	–		€0.80	(USD 0.74)
Intraday liquidity in euros				
Fee for intraday liquidity	–		10 basis points, EUR	
Excess reserve data link	SEK 30,000	(USD 3,023)	SEK 30,000	(USD 3,023)
New member in the RIX system				
Entry fee ¹	SEK 75,000	(USD 7,558)		

¹ Not specific for K-RIX or E-RIX.

3.3 Retail payment systems

3.3.1 *The Postgirot*

The Postgirot is essentially a system for credit transfers between accounts held with what is now the Postgirot Bank, recently purchased by Nordea. The Postgirot system handles all kinds of transactions, both low-value payments to and from households and large-value government payments.

Households make extensive use of the Postgirot system, partly as a result of the cooperation agreements that exist between some of the banks and the Postgirot system. Nordea, one of the largest commercial banks, has established links between its system for handling salary payments to government employees and the Postgirot system. In addition, the savings banks have a large number of salary accounts linked to the Postgirot system. The fact that all post office branches in the country can handle transactions, and that they have longer opening hours than the banks, has of course contributed to the popularity of the system.

The Postgirot Bank has customer relations with households, companies and other banks which use the Postgirot Bank's services. Banks are charged according to specific arrangements between the bank in question and the Postgirot Bank. With regard to households, companies and organisations, the Postgirot Bank has price lists containing information on fees for the different services it offers.

Since 1986 the Postgirot system has been a member of the SWIFT network for international transactions. At the beginning of the 1990s the Postgirot was integrated into Euro-giro, the European network for postal giro systems for the handling of cross-border payments.

In 1999 the Swedish government decided to sell the Postgirot Bank. The four major banking groups in Sweden announced their willingness to jointly acquire the whole stock of accounts held by the Postgirot Bank. Their intention was to merge the Postgirot and the Bankgirot systems. However, the Swedish Competition Authority decided against this merger on the grounds that it would lead to the creation of a private monopoly. Instead of the joint takeover, one of the four major banking groups, Nordea, acquired the Postgirot Bank. The Postgirot Bank has recently become a full member of the Bankgirot system.

3.3.2 *The Bankgirot*

The Bankgirot system is mainly used for credit transfers between bank accounts. By contrast with the Postgirot system, there are no separate Bankgirot accounts; instead, ordinary bank accounts are given

a Bankgirot number. In other words, the Bankgirot system is an “open” payment system in which customers can transfer payments from an account with one bank to an account with another bank. The Bankgirot is an ACH managed by BGC and owned by the banks. 20 banks are currently affiliated to it. BGC manages and develops the Bankgirot system and offers its products and services to the banks on a purely subcontractual basis. A wide range of information services relating to the processing of payments is included in the services offered to banks.

The Bankgirot system mainly handles retail payments, but also processes certain large-value payments. Bankgirot payments are settled on a bilateral net basis in the RIX system, whereby payment orders between each pair of banks are calculated to a net debit or credit position. These net balances are registered in the banks’ accounts at the Riksbank for settlement during the day. If one participant has liquidity problems at the time of settlement, the payment is put in a queue. The transaction is queued for no longer than 30 minutes; if the bank is still unable to settle its net position after this period, the net position is recalculated as a pair of gross payments. In this way, a bank’s liquidity problems do not hinder a counterpart from settling its own obligations. Different types of payment have different settlement schedules throughout the day. After settlement, the underlying payments are sent to the receiving bank by file transfer.

The Bankgirot system differs from the Postgirot system in that it only has customer relationships with the banks. These banks, whether they are shareholders of BGC or not, are charged at cost. Banks face a combination of fixed transaction fees and variable fees that decrease with the volume of transactions conducted.

Partly in response to the rapid development of electronic payment delivery and processing technology, such as internet payment services, and after discussions with the Riksbank, BGC adopted in 1999 a new technical platform and new clearing procedures. The development of the new clearing platform has led to the full integration of all systems involved in the clearing and settlement cycle, namely the RIX system, BGC’s clearing information system and the clearing participants’ internal systems. There have been two additions to the existing communication channels: a new internet-based information channel and a new interface between BGC and the clearing participants. These allow the participants to follow their clearing positions in real time via the internet. The system handles two types of clearing and settlement methods: bilateral gross and net clearing and settlement. It has several clearing and settlement cycles per day, one or more for each category of payment. The number of payment services processed by the new platform is gradually increasing. The clearing and settlement of banks’ cash transactions through PSAB, which was previously carried out by the Riksbank, has been included in the range of services provided by the new BGC system. Also the Data Clearing System has been integrated into BGC’s new technical platform.

3.3.3 Credit and debit cards

The vast majority of credit and debit card transactions - except for those relating to retailer cards - are channelled through specialised data processing companies. Domestic transactions with Visa-linked cards are cleared by Visa’s own system in London, while MasterCard/Europay-enabled transactions are cleared by Europay’s network in Brussels.

3.3.4 E-money schemes

There is one countrywide e-money scheme in operation, which utilises Proton technology. It is a card-based system run by three of the major Swedish banks in cooperation with one another. The cooperation between these banks covers technological development, marketing activities and brand administration. In addition to these aspects, each bank issues its own card with that bank’s own logo together with the joint brand name, “Cash”. However, the system allows for full interoperability in the sense that all vendor devices and loading terminals accept all Cash cards regardless of the identity of the issuing bank.

A central Proton collecting system run by one of the banks in the Cash association collects transactions stored at the POS terminals once a day. The system provides each acquiring bank with a clearing file of information on retailer accounts and the amounts with which these are to be credited. The clearing of transactions between issuing banks and acquiring banks is carried out in bilateral batches through the Data Clearing System run by BGC. According to the contract which regulates the Cash association’s activities, surviving Cash banks guarantee that merchants’ and cardholders’

e-money holdings shall be reimbursed in the event of bankruptcy on the part of either the acquiring or the issuing bank.

4. Securities settlement systems

4.1 Trading

4.1.1 Institutional and legal aspects

The Swedish securities market comprises the equities and derivatives exchange, the money and bond market, and OTC derivatives. Equities, bonds and money market instruments are all dematerialised in the VPC system, which also handles the clearing and settlement of these instruments, while Stockholmsbörsen clears and settles derivatives. (Stockholmsbörsen and VPC are described in more detail in Sections 4.2 and 4.3 respectively.)

Finansinspektionen is responsible for the authorisation and supervision of exchange and clearing and settlement organisations (see Section 1.3). Sveriges Riksbank has an oversight role.

The Swedish securities markets have been consolidated in the past few years as a result of two mergers which occurred in 1998. Stockholmsbörsen was established by the merger of OM's derivatives exchange - OM Stockholm - and the Stockholm Stock Exchange. In the same year, Stockholmsbörsen acquired Penningmarknadsinformation Pml AB (Money Market Information), which it now operates as OM Fixed Income Exchange. Stockholmsbörsen is owned by OM AB, a privately owned company listed on Stockholmsbörsen.

The trading of stocks and derivatives and, since 2001, inter-dealer trading in some government bonds take place on electronic trading platforms offered by Stockholmsbörsen. Stockholmsbörsen has a trading system, called SAXESS, for trading equities and bonds. Only exchange members are allowed to trade in the SAXESS system. Prospective members must be authorised by Finansinspektionen or a home country supervisor. Furthermore, they must have equity of at least SEK 6.8 million (USD 650,465) and at least two employees who meet the standards set for a trader for trading via SAXESS. In order to be authorised as a trader in the SAXESS system, an employee must have at least six months' experience in securities trading in a member firm, a documented satisfactory knowledge of stock market legislation, economics, financial markets and financial analysis, and have passed the SAX training course.

In the first quarter of 2002, members included 32 Swedish banks and securities firms, seven foreign branches in Sweden and 42 remote members, ie without a presence in Sweden.

In May 2001, Stockholmsbörsen started up an electronic market for inter-dealer trading in government benchmark bonds. Since the beginning of 2002, the market has been handling all trading in 10-, five- and two-year government benchmark bonds. At present, 50% of all trading in government bonds takes place on the electronic market. Membership is limited to dealers who are market-makers and these must trade in these bonds exclusively on the electronic market. There are currently seven such members. Trading is carried out in the SAXESS system and is market-maker-driven. The Swedish National Debt Office issues all of its debt instruments directly into the electronic marketplace, even those instruments which are not traded electronically. Stockholmsbörsen also has an electronic trading system, called SOX, designed for trading bonds and money market instruments among smaller and medium-sized investors.

In addition to the two exchanges, there are two other authorised marketplaces offering trading facilities, AktieTorget AB and Nordic Growth Markets AB. They both offer a primary and a secondary market for relatively small companies with growth potential. AktieTorget cooperates with Stockholmsbörsen and uses the SAXESS trading system, while Nordic Growth Markets AB uses a different system called Tellus.

Legal basis

Trading is mainly regulated by the Exchange and Clearing Operations Act and the Trading in Financial Instruments Act.

Basic quantitative aspects

The market value of the shares listed on Stockholmsbörsen amounted to SEK 2,856 billion (USD 273 billion) at the end of 2001. The value of all transactions conducted in 2001 was SEK 3,994 billion (USD 382 billion). The number of equity transactions totalled 10,628,000 during 2001.

The turnover in value terms of dematerialised securities is much higher in the money and bond market than in the equity market. The outstanding nominal value of money and bond market instruments as of December 2001 amounted to SEK 1,719 billion (USD 164 billion), while the transaction value stood at SEK 42,756 billion (USD 4,088 billion).

4.1.2 Operational aspects

Stock and derivatives market

Since 1999 trading on Stockholmsbörsen's exchanges has been based on the computerised trading system, SAXESS. Trading is conducted by traders who operate from their own offices via PCs connected to the SAXESS computer at Stockholmsbörsen. The institutional and operational aspects of using the computerised trading system for small-value bond and money market trades, SOX, are similar to those involved when trading equities. Trading in SOX is carried out through the SAXESS system, and the following description therefore also applies to this type of fixed income trading. The instruments traded include shares, bonds, premium bonds, convertibles and fixed interest securities.

SAXESS trading in the equity market is order-driven. Bids and offers are automatically matched to generate deals when price, volume and other order conditions are met. Trade orders are executed according to price and time priority. For very large trading lots, deals may be made by telephone, but have to be entered manually into the SAXESS system.

Information about changes in the market is continuously broadcast. The information is displayed in real time in the form of order books, market summaries, concluded deals, index information and reports of various kinds. All traders receive the information at the same time. Traders can thus enter their orders without having to be in personal contact with the other party. At the same time, they gain an instant overview of the market situation.

Most trading takes place in the trading lot market, where shares are traded in lots. In order to maintain an efficient market for small orders as well, a specific odd lot market has been developed. The two markets are integrated in such a way that the remaining odd lot portion of a larger order is automatically moved to the odd lot market if the volume of the order falls below that of a trading lot.

Automatic matching in the odd lot market can only be performed at the last paid price in the trading lot market. Deals can also be generated between trading lot orders and odd lot orders. Before continuous trading begins, there is an opening pre-trade session during which the traders can enter limit orders. The order book is not revealed during this session. The total volume of orders in each security is accumulated and the opening price is set at the level at which most shares may be traded. Once trading for a specific share opens, continuous trading begins.

There are two ways of closing a deal in the SAXESS system: automatic matching and off-exchange registration. Automatic matching and off-exchange registration are used for all instruments traded in SAXESS. Off-exchange registration occurs when two parties agree the terms over the telephone. The trader must then report the deal to SAXESS within five minutes during the trading day, or no later than 15 minutes before the start of the next trading day if the deal is made after the close of SAXESS. The same rule applies to internal crossings. For shares with the highest turnover, orders of 500 trading lots or less must be traded within the spread. For other shares, orders of 250 trading lots or less must be traded within the current spread.

Currencies

Since 1999 trading on Stockholmsbörsen has been possible in two currencies, Swedish kronor and euros. Listed companies may choose the trading currency. There are three alternatives for listed companies - trading in Swedish kronor, trading in euros, or trading in both Swedish kronor and euros. In all cases, the registered share capital for Swedish companies remains in Swedish kronor.

Operating hours

On normal working days the system is open for trading between 9.30 am and 5.30 pm.

Risk management

In order to ensure a sound and transparent market, there is a membership agreement which governs members' obligations and listing agreements. The duties of Stockholmsbörsen include monitoring members' compliance with the agreement and ensuring that members act in a manner which fosters confidence in the securities market. The surveillance is carried out with the help of electronic systems which indicate abnormal changes in prices and volumes. Unsound, illegal or other misleading trading which contravenes existing trading rules or membership agreements is investigated and reported to Finansinspektionen.

Links to other systems

Stockholmsbörsen, the Copenhagen Stock Exchange, the Iceland Stock Exchange and Oslo Börsen have been joined together in a common trading system and have adopted common rules and regulations. Integration was effected within the framework of the NOREX Alliance, the ambition of which is to integrate the Nordic financial marketplaces.

Bond and money market

The bond and money market is organised as a dealer market, and the market-makers are authorised by the respective issuer. Primary dealers have the exclusive right to act as counterparties in the monetary operations of the Riksbank, but are at the same time obliged to be market-makers in those securities in which the Riksbank trades. A prerequisite for being accepted as a primary dealer is the authorisation of the applicant as a market-maker in government securities by the Swedish National Debt Office. A basic requirement is the authorisation by Finansinspektionen to act as a dealer or, in the case of foreign companies, the authorisation by a corresponding authority in their home country.

As of December 2001, six banks and one security firm were authorised as primary dealers.

On the bond and money market the market-makers supply the liquidity at each given moment in time. The market-makers compete for investors' orders by quoting prices at which they will buy and sell. Customer trades are not made directly with another customer; instead, all trades are made with the market-maker as a counterparty. Government benchmark bonds with two-, five- and 10-year maturities are now traded electronically between market-makers on Stockholmsbörsen's electronic exchange (for a description, see Section 4.1.1).

4.2 Clearing**4.2.1 Institutional and legal aspects**

Stockholmsbörsen is the only clearing organisation in Sweden which acts as a central counterparty in the transactions which are cleared. Stockholmsbörsen is a wholly owned subsidiary of the listed company OM AB. By the end of 2001 the Swedish state owned close to 10% of the capital and voting rights. The shareholdings of the four largest Swedish banks totalled about 11% of the capital and voting rights. In addition to its clearing house function, Stockholmsbörsen is also an exchange, as described in Section 4.1.

Stockholmsbörsen is a private company incorporated in Sweden under the Companies Act and is an authorised exchange/clearing house operating under the Exchange and Clearing Operations Act. It is supervised by Finansinspektionen, which has established a regulatory framework for the exchange's clearing and settlement system.

Clearing membership of Stockholmsbörsen is open to institutions authorised to deal in securities according to the Securities Operations Act, or to equivalent foreign institutions, ie institutions supervised by Finansinspektionen or by a corresponding agency in their home country. The minimum capital requirement is SEK 10 million (USD 1,007,737), calculated as shareholders' equity after tax. There is only one type of clearing member. In March 2001, Stockholmsbörsen had 43 clearing members.

Stockholmsbörsen has a direct relationship with each customer, ie the owner of a clearing account. The customer acts in relation to Stockholmsbörsen through one of the clearing members who is the clearing account administrator. The identity of customers is not known to the exchange, only to the account holder and to a special control company, clearing company AB, a company owned by Stockholmsbörsen and the Swedish Securities Dealers' Association.

4.2.2 Operational aspects

When a transaction is accepted for clearing, Stockholmsbörsen becomes a counterparty to the parties involved, ie the seller to the buyer and the buyer to the seller. For transactions undertaken on the derivatives exchange, Stockholmsbörsen steps in as the central counterparty directly when the transaction is registered. A transaction is registered on a trading account of the customer carrying out the trade. The transactions are then integrated into a clearing account or connected to a separate clearing account administered by a member of the exchange.

Products

The clearing activity covers both derivative products traded on Stockholmsbörsen and products traded outside the exchanges. Stockholmsbörsen does not generally clear spot market transactions. However, in March 2002, a central counterparty service was set up covering transactions arising when the Swedish National Debt Office initiates new issues, buybacks and exchanges.

The following products are traded on the OM exchanges:

- futures and options on Swedish shares;
- futures and options on the Swedish share index;
- futures on Swedish government bonds;
- futures and options on Norwegian shares;
- futures and options on the Norwegian share index;
- futures and options for pulp;
- futures on the UK electricity market; and
- 10-, five- and two-year government benchmark bonds.

The following products are only cleared:

- futures on Swedish government securities and securities issued by Swedish mortgage institutions;
- futures on three-month forward rate agreements (FRAs);
- Swedish index swaps;
- standardised swap contracts;
- futures on currency; and
- tailor-made clearing contracts for fixed income and equity products.

Risk management

For all outstanding contracts there must be sufficient collateral pledged to Stockholmsbörsen. Collateral can be pledged either individually by each customer, or by the clearing member for both its own and its customer's obligations. Margin requirements are calculated at the end of each day, and additional collateral must be delivered before 11 am the following day. Stockholmsbörsen can also make intraday margin calls. A margin is calculated for each separate clearing account, but, within an account, potential covariance between positions and products is accepted.

Stockholmsbörsen accepts different types of assets as collateral, such as cash in 10 currencies, government securities from seven countries, certain other Swedish fixed income securities and certain Swedish, Danish, Finnish and Norwegian listed shares. Collateral is to be deposited with one of the custodian institutions accepted by the exchange, of which there were 11 in March 2002. Collateral is

held separately from Stockholmsbörsen assets. The total outstanding contracts or the total margin amount can be limited by monitoring the largest positions.

In the event of default by customers, Stockholmsbörsen has its own financial resources in addition to the collateral received from customers. These include some SEK 1.3 billion (USD 131 million) in shareholders' equity and subordinated debt, SEK 720 million (USD 73 million) in credit insurance and a credit facility for another SEK 1.5 billion (USD 151 million).

Contingency procedures have been established. Computer and communication facilities are duplicated on a real-time basis.

Connections to trading systems and settlement

Derivative transactions which are traded on Stockholmsbörsen are automatically transferred to the clearing system. Other transactions are fed into the system through interfaces with members' in-house systems.

All fund settlements (option premiums, variation margins, fees and maturing contracts) are made via Stockholmsbörsen's account in the RIX system on a multilateral net basis. Settlements take place on a daily basis. All clearing members which have an account with the RIX system in Swedish kronor or euros register their net debit or credit transactions in this account no later than 11.30 am. Clearing members who do not have an account in the RIX system act through a settlement bank. Stockholmsbörsen confirms these transactions at 11.45 am, at which time they are settled simultaneously and finalised. As a party to all transactions, Stockholmsbörsen guarantees settlement and replaces defaulting members in the settlement process.

Operating hours

Stockholmsbörsen's system is open for clearing registration from 8 am to 6.30 pm, and for trading from 9.30 am to 5.30 pm.

4.3 Settlement

4.3.1 Institutional and legal aspects

VPC AB is the only clearing and settlement organisation in Sweden operating an SSS - the VPC system - and providing the services of a CSD. The four largest Swedish banks own 98.6% of its shares and voting rights in equal parts. Minor banks and investment firms own the remaining 1.4%.

VPC is a joint stock company with limited liability incorporated in Sweden under the Companies Act. VPC is operated on a for-profit basis and is authorised and supervised by Finansinspektionen as a clearing organisation operating under the Exchange and Clearing Operations Act, as operator of a designated settlement system under the Settlement Systems Act and as a CSD under the Financial Instruments Accounts Act. VPC is also subject to oversight by Sveriges Riksbank.

Membership

Public rules on access and exit criteria are outlined in VPC's Rules and Regulations, which are available to participants and are posted on VPC's website. Clearing membership of VPC is open to institutions authorised to deal in securities according to the Securities Operations Act or similar foreign institutions, ie institutions supervised by Finansinspektionen or by a corresponding agency in their home country. In addition, Swedish and foreign clearing organisations and CSDs, as well as central banks, may become members. The capital requirements for financial institutions other than clearing organisations and CSDs are limited to the minimum capital requirements, including capital adequacy, according to the respective domestic regulation. For clearing organisations, CSDs and non-financial institutions participating in money market clearing, the capital requirement is SEK 1 billion (USD 95,621,491). In addition to capital requirements, there are organisational requirements. In the case of money market clearing, an indirect participant takes part in the clearing through a clearing member.

Clearing membership can be restricted to either stock market clearing or money market clearing, or can cover both. In addition, the RTGS functions are open to all clearing members. Clearing membership is divided into two categories: either Swedish kronor or euros, or both. In March 2002,

VPC had 45 clearing members, of which 43 participated in the guarantee clearing procedure (see below under the section entitled "Risk management") and 18 in the money market clearing procedures. All 45 members can participate in the RTGS clearing procedure.

Participation in the system

The participants in the VPC system are issuers, account operators, authorised nominees, clearing members, settlement banks and account holders. Issuers may issue shares, debt instruments, certain types of derivatives or other types of financial instrument. In December 2001, securities issued by 1,157 issuers were handled in the guarantee settlement cycle, a settlement procedure primarily for stocks (see description below). In the money market settlement procedure, there were securities issued by 120 issuers. Account operators are technically affiliated to the VPC system and are the only entities, apart from VPC itself, which are directly involved in entering book-entry registrations in the system. In general they represent the investors, although some account operators act on their own account only. In December 2001, there were 47 account operators, primarily banks and investment firms, but also a few issuers and large investors. Account operators are approved by VPC. The requirements are similar to those for clearing membership. For account operators, however, there are technical requirements, but no capital requirements. Investors can have their securities holdings registered either in an account opened in their own name in the VPC system (there are 3.8 million such accounts held by 3.5 million individuals) or under a nominee registration in a nominee account opened in the name of a nominee authorised by VPC.

Legal basis

The legal framework for the registration of dematerialised securities is found in the Financial Instruments Accounts Act. The finality of settlement is supported by the Swedish implementation of the EC Directive on settlement finality through the Settlement Systems Act.

4.3.2 Operational aspects

Settlement processes

There are three main clearing and settlement processes: real-time gross settlement, net settlement for the money market and net settlement for the stock market.

In the case of an RTGS process, cash is moved from the cash account operated by VPC to the seller's cash account at the Riksbank at the same time as the securities are moved from the seller's securities account to the buyer's securities account within the VPC system. The settlement is then final.

In net settlement processes, securities are registered and delivered gross, while payments are netted on a multilateral basis with the net amounts being reported. Settlement banks with a net payment obligation debit the amount from their own cash accounts and credit the cash account operated by VPC at the Riksbank. Securities and payments are then settled simultaneously and irrevocably at 12.45 pm. These net processes are run once a day. The settlement of euro transactions is carried out separately from the settlement of transactions in Swedish kronor, but in a similar way and at the same time.

One major difference between money market settlement and settlement for the stock market is that in the latter case there is no possibility of entering transactions on the settlement day. In the case of money market clearing, this possibility exists. The delivery capacity check starts at 1.15 pm on the day before the settlement day for money market clearing, while for stock market clearing this check is made continuously from the time at which the transaction is entered in the system by the account operator.

Cash settlement and delivery versus payment

Cash settlement is made in central bank money via Riksbank accounts in the RIX system. VPC clearing members who have no access to the RIX system must use a settlement bank which is a member of the RIX system. For each clearing procedure one net amount per currency is calculated for each settlement bank. This net amount includes payments for the settlement bank's own transactions as well as other clearing members' payments.

The cash settlement takes place at the same time as the settlement of securities, and DVP is thus achieved. The settlement immediately becomes final and irrevocable.

Links to other settlement systems

As of September 2002 VPC had direct CSD links to the Danish system, VP, for government bonds, the British system, Crest, for AstraZeneca shares, the Swiss system, SIS, for ABB shares and the Finnish system, HEX, for Swedish and Finnish securities.

Risk management

VPC is not a party to any transaction to be settled and does not offer any custody services. It does not offer any credit or stock lending facilities. The account it holds at the Riksbank is in the name of its customers and its balance should be zero after settlement has been executed.

All Swedish book-entry instruments are issued directly via VPC. For some foreign instruments, depositories are used. Depositories are highly reputable commercial banks (custodians).

In order to minimise the risk of insufficient funds, the guarantee clearing procedure contains a requirement that the stock market have a basic guarantee from a settlement bank for those clearing members not settling the cash leg in the RIX system. This basic guarantee is based on the historical average net settlement amounts. In addition, there should be a supplementary guarantee for amounts not covered by the basic guarantee. The basic guarantee may not be withdrawn with less than seven days' notice. The supplementary guarantee must be in place by 10 am on the settlement day.

In the event that there are not enough securities to cover all sales, transactions are cancelled. In this context, in the case of money market clearing, certain clearing members (in particular primary dealers) have been assigned special responsibilities to prevent further disturbances in the settlement process by covering their emerging shortages.

In the event of insufficient funds or a lack of a supplementary guarantee (in the case of guarantee clearing), all transactions by the defaulting participant (clearing member or indirect participant) are unwound and a delayed settlement routine is activated, whereby non-defaulting participants take over the failed trades. In the money market clearing procedure, the participants have an obligation to participate actively in this process through repos or securities lending transactions. The issuers also have an obligation to issue new securities, should this prove necessary.

Operating hours

VPC is open for registration and settlement (RTGS) from 7 am to 6 pm. Transactions may be entered outside these hours, but in such cases are not formally registered.

4.4 The use of the securities infrastructure by Sveriges Riksbank

4.4.1 Collateral management

The Riksbank uses the VP system to receive collateral for monetary policy and payment system credit operations, and as a correspondent for other central banks. The Riksbank previously used a valuation service provided by VPC for this purpose. This service was replaced in January 2001 by an in-house collateral information system, developed by the Riksbank.

4.4.2 Other uses of systems

The Riksbank registers its holdings of Swedish securities with VPC and uses VPC for settlement when carrying out operations directly related to monetary policy.

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List of abbreviations

CLS	continuous linked settlement
DTA	<i>Datenträgeraustausch</i> (data media exchange facility)
EBPP	electronic bill presentment and payment
FBC	Federal Banking Commission
LSV	<i>Lastschriftverfahren</i> (direct debit facility)
SECB	Swiss Euro Clearing Bank
SET	Secure Electronic Transaction
SIC	Swiss Interbank Clearing
SIS	SIS SegalInterSettle AG (formerly SEGA AG)
SNB	Swiss National Bank
SWX	Swiss Stock Exchange

Introduction

The Swiss trading, settlement and payment infrastructure consists of various interlinked electronic systems. Swiss Interbank Clearing (SIC) is the real-time gross settlement (RTGS) system designed for settling interbank payments in Swiss francs in accounts at the Swiss National Bank (SNB). SIC is operated by Swiss Interbank Clearing AG, a subsidiary of Telekurs Holding, which is a private sector company involved in payment activities. In 1995 a link between SIC and SECOM, the securities settlement system operated by SIS SegalInterSettle AG (formerly SEGA), was established to allow simultaneous and final delivery versus payment on a real-time basis. In 1996, a connection with the Swiss Stock Exchange (SWX) was established. This connection allows straight through processing of securities operations (eg from trading to settlement). Swiss Interbank Clearing AG also operates retail payment systems such as DTA (data media exchange) and LSV (direct debit). Postfinance provides similar payment services through its own network.

Over the last few years, two major trends have affected the trading, settlement and payment infrastructure in Switzerland. First, the growing internationalisation of trading, settlement and payment activities has led to cross-border network connections. At the trading level, SOFFEX (Swiss Options and Financial Futures Exchange, a former subsidiary of SWX) and Deutsche Terminbörse (DTB) merged in 1996 to create Eurex, the Swiss-German derivatives exchange. In 2001, SWX, the UK-based Tradepoint Exchange and Tradepoint Consortium launched virt-x, a pan-European trading platform for blue chips of all major European indices. At the securities settlement level, SIS SegalInterSettle and CRESTCo created The Settlement Network in 2000. At the payment system level, this trend made it necessary to allow financial institutions located outside Switzerland to participate in SIC (so-called remote members). Second, the various retail payment systems have been progressively integrated into SIC. In this way, the aggregate gross positions resulting from these systems are settled in SIC. This process started in 1998 with the integration of DTA and LSV and was completed with the integration of cheque settlement in 2000.

In addition, some innovations have been introduced in SIC. Intraday credit in the form of intraday repos was made available to SIC participants in 1999. Further, Postfinance has been participating in SIC since 2000. This has simplified payment flows between the bank and Postfinance systems. Lastly, in 2001, the SIC queuing mechanism was amended with a bilateral offsetting mechanism aimed at solving gridlocks. At the regulatory level, the new Law on the SNB, which is expected to be enacted in 2004, will create a formal basis for the SNB's oversight responsibilities in clearing, settlement and payment systems.

1. Institutional aspects

1.1 The general framework

Cashless transfers on behalf of customers are executed in Switzerland by commercial banks and the state-owned Postfinance. Rules governing banking operations are contained in the Federal Law on Banks and Savings Banks, those governing the activity of Postfinance in the Postal Service Law.

Under Swiss law, no comprehensive and uniform set of rules governing payment systems has been enacted. Rather, the legal framework for the operation of these systems consists of contractual arrangements among the various participants, including general contract terms and technical regulations. These contracts are based on the general principles of the Civil Code and the Code of Obligations.

1.2 The role of the Swiss National Bank

1.2.1 Oversight of payment systems

Article 99 of the Federal Constitution of the Swiss Confederation concerns monetary policy. It entitles the Swiss National Bank (SNB), as an independent central bank, to pursue a monetary policy that serves the general interest. At a more concrete level, the tasks of the SNB are defined in Article 2 of

the Law on the SNB. The SNB has “to regulate the country’s money circulation, to *facilitate payment transactions* and to pursue a credit and monetary policy that serves the interests of the country as a whole”.

The current Law on the SNB is fairly vague about the role of the central bank as overseer of payment systems. With respect to Swiss Interbank Clearing (SIC), the RTGS system in Switzerland, two private law contracts enable the SNB to exercise its oversight responsibility. The first contract is between the SNB and SIC AG, the system operator. The second contract governs the relationship between the SNB and the participants.

The Law on the SNB, however, is currently under revision. The new Law, which is scheduled to become effective in 2004, creates a formal basis for the SNB to oversee not only payment systems, but also securities clearing and settlement systems.¹ Oversight activities will be conducted according to a three-stage procedure. The first stage requires all system operators to provide the SNB with basic statistical information. The second step allows the SNB to gain more precise information on systems that are potentially of systemic importance. The third stage deals with systemically important payment and settlement systems. These systems may be subject to specific requirements and sanctions, if necessary.

1.2.2 Banking activities

The SNB acts as the Confederation’s bank. It takes care of some of the Federal Government’s domestic and foreign payments (via giro accounts), the collection of commercial bills and cheques and the administration of securities and valuables. In addition, it cooperates in the investment of Federal funds and the issuing of Federal bonds.

The automatic financing of federal budget deficits by means of central bank credits is precluded by law. Cooperation in the investment of Federal funds - which is governed by an agreement between the Federal Finance Administration and the SNB - is of particular interest to the SNB because the way in which the Government manages its current resources influences the liquidity of the money market. The SNB’s cooperation in the issuing of bonds, treasury bonds and money market claims is of a technical and advisory nature. The SNB also acts as a payment office for coupons and repayments of government bonds.

1.2.3 Provision of cash settlement facilities

(a) Provision of giro (or reserve) accounts

Article 14 of the Law on the SNB empowers the central bank to operate giro (or reserve) accounts and carry out giro and clearing transactions. The SNB operates giro accounts for banks, public entities, foreign central and commercial banks and international organisations. At the end of 2000 there were 588 accounts. Giro account balances are non-interest bearing sight liabilities of the SNB. Giro accounts are maintained free of charge. The SNB’s giro system is used above all for the processing of payment instructions from banks which are not participants in SIC, and for cash inpayments to and withdrawals from the SNB. Orders are voucher-based.

Members of the SIC system must have a giro account at the SNB. It is split into an SIC account and the traditional giro account which, in the payment system context, is called the “master account”.

(b) Provision of credit facilities

In implementing monetary policy, the SNB usually enters repo transactions at 9 am every working day. It also provides intraday and overnight credit facilities. The intraday credit facility - in the form of intraday repos - aims at facilitating settlement in SIC. There is no interest charge on intraday repos. Banks can obtain intraday credit from the beginning of the settlement day (around 5.30 pm). After 8 am intraday credit is available at any time up until 2.45 pm. If the participant has enough collateral, the funds are transferred within seconds of the request being made. Repayment of the intraday credit

¹ In the area of securities clearing and settlement systems, the SNB and the Federal Banking Commission (FBC), the banking supervisory authority, will cooperate closely.

can be made at any time during business hours. If it is not repaid by the end of the day (clearing stop 3 at 4.15 pm), an interest charge that exceeds the overnight rate by (currently) 400 basis points applies.

The overnight credit facility - the lombard facility - offers financial institutions facing an unexpected liquidity shortage a refinancing source. Financial institutions draw on lombard credits on their own initiative and at any time of the day (in practice, mostly towards the end of the day). They freely set their credit limit at the SNB by pre-pledging eligible securities. Credit lines can be adjusted once a year. For lombard loans, the SNB charges a rate that exceeds the overnight rate by 200 basis points (lombard rate).

1.3 The role of other private and public institutions

1.3.1 Banks

At the end of 2000 there were 335 banks in Switzerland with a total of 2,849 branches subject to the Swiss Banking Law. These include 23 branches of foreign banks with 27 offices. Most of the banks are universal banks, which offer their customers a full range of banking services. However, a number of banks are specialised: private banks, for instance, are engaged almost exclusively in investment management, while other categories of banks (the regional and savings banks) are concerned predominantly with mortgage business. In addition to the usual payment services such as inpayment, outpayment and credit and debit transfers, the banks also offer credit, debit and stored value cards.

In 1949 the big banks founded their own giro organisation, the "Bank Clearing" organisation. Over the next few years the cantonal banks, the regional banks and most other institutions also joined this system. In 1981 responsibility for the administrative and technical operation of the system was assigned to Telekurs Payserv Ltd (today's Swiss Interbank Clearing AG), a joint venture of the Swiss banks. The regional banks have been operating their own giro system since 1981, since which time they have been participating indirectly in Bank Clearing via their clearing centre. In 1994, the regional banks formed a new holding company, RBA-Holding. The previous clearing centre was fully integrated into this new company in 1996.

1.3.2 Postfinance

As early as 1906, a year before the SNB was founded, the Postal Administration received authorisation to open accounts for any firm or private individual; transactions such as cashless transfers, inpayments and outpayments could be carried out through these post office accounts. The Postal Administration's network of post offices throughout Switzerland provided the necessary infrastructure. In order to tell the two postal services - mail and banking business - apart, the former is called "Die Post" (Swiss Post) and the latter is called "Postfinance". In 2000 Postfinance had a network of 3,385 post offices. With over 2.2 million accounts and 737 million transactions a year, Postfinance plays a major role in the field of retail payments. The banks also execute some of their customers' payment orders via Postfinance. Since 2000 payments between bank and Postfinance networks have been settled in SIC.

1.3.3 Credit card companies

Credit cards have become exceedingly popular in recent years. MasterCard/Eurocard, Visa, American Express and Diners Club cards predominate on the Swiss market. Acquiring is handled by Europay (Switzerland) SA and also by some banks directly. Since 2001, the banks have handled the issuing of credit cards. Settlement occurs at the banks' processing centres or at Payserv Ltd. In addition, other companies such as Postfinance and the Federal Railways appear as brand names on credit cards. Petrol companies and large retailers also issue credit cards for use in their own outlets only.

1.3.4 Telekurs Holding Ltd

Telekurs Holding Ltd is a service organisation owned by Swiss banks. It provides services in the fields of payment systems and financial information. Swiss Interbank Clearing AG, a subsidiary of Telekurs Holding, is the operator of the SIC system. Other subsidiaries involved in payment systems are Payserv Ltd and Europay (Switzerland) SA. Payserv Ltd is active in payment instruments and systems, while Europay (Switzerland) SA is committed to promoting cashless payment instruments.

1.3.5 FSG Swiss Financial Services Group

Like Telekurs Holding, the FSG Swiss Financial Services Group is owned by the Swiss banking community. The most important subsidiary of the FSG Group with regard to the Swiss market infrastructure is SIS SegalInterSettle AG (SIS). SIS undertakes the central custody of securities and the settlement of securities transactions through its SECOM platform.

1.3.6 SWX Swiss Exchange

The SWX Swiss Exchange (SWX) was created in 1995 through the merger of three regional exchanges (Basel, Geneva and Zurich). It is registered as an association within the context of Article 60 of the Swiss Civil Code. It is a non-profit organisation. SWX operations are governed by the Swiss Federal Act on Stock Exchanges and Securities Trading, which also provides the legal basis for self-regulation. It is licensed and supervised by the Federal Banking Commission.

1.3.7 Eurex

The Swiss-German derivatives exchange Eurex was created by SWX and Deutsche Börse AG in December 1996 through the merger of SOFFEX (Swiss Options and Financial Futures Exchange, a former subsidiary of SWX) and DTB Deutsche Terminbörse. Eurex Clearing AG is wholly owned by Eurex Frankfurt AG, which in turn is a subsidiary (100%) of Eurex Zurich. The latter is jointly owned by Deutsche Börse AG and SWX.

2. Payment media used by non-banks

2.1 Cash payments

The exclusive right to issue banknotes is conferred on the SNB by the Federal Constitution. This includes periodically developing new series of banknotes as well as the production, distribution and withdrawal of banknotes; old and unusable banknotes are destroyed and replaced by new ones. Banknotes are produced by a private sector company; issue and withdrawal is carried out by the SNB via its offices in Zurich, Berne, Geneva and Lugano and 18 agencies operated by cantonal banks. Coins are struck by the Federal Mint in Berne. The distribution and withdrawal of coins throughout the country is carried out by the SNB. Notes are issued in six denominations (CHF 10, 20, 50, 100, 200 and 1,000) and coins in eight denominations (CHF 0.01, 0.05, 0.10, 0.20, 0.50, 1, 2 and 5).

In Switzerland cash continues to be the most widely used payment medium in retail business. Cash withdrawals are made mainly at cash dispensers or over the counter at banks and post offices. In 2000 currency in circulation - including cash in bank vaults - amounted to CHF 37.8 billion. Notes and coins are legal tender.²

2.2 Non-cash payments

2.2.1 Sight deposits

Firms and individuals use sight deposits at banks and Postfinance to make cashless payments. In 2000 sight deposits amounted to CHF 97 billion. Currently, the banks pay interest of approximately 0.25% on current accounts and of around 0.5% on salary and personal accounts; Postfinance pays 0.5% interest on personal account balances of up to CHF 10,000 and 0.25% on business accounts. Other types of accounts such as savings and time deposit accounts are not used directly for making payments.

² According to Article 6 of the Federal Coinage Law no one is obliged to accept more than 100 coins in payment.

2.2.2 Credit transfers

The overwhelming majority of cashless payments in Switzerland take the form of credit transfers. In 2000 a total of more than 545 million credit transfers were executed by the banks and Postfinance.

Bank and Postfinance customers have the possibility of issuing standing orders for regular payments. These payments are executed automatically on a date specified by the customer. This method is typically used for payments such as rent and health insurance premiums.

Cashless settlement of bills typically implies a payment slip. Two different payment slips are distinguished, a blue one and a red one. The blue payment slip has a reference number facility. Under this facility the person to whom payment is due, as a participant in the system, provides the debtor with a bill together with a payment slip which can be processed by OCR. If the beneficiary of a payment processed by Postfinance is a holder of a bank account or vice versa, the aggregate is transferred via SIC. The information pertaining to the transaction is, however, sent in different formats (from paper-based to different electronic forms) according to choice. The red payment slip, which is only issued by Postfinance, is still to some extent manually processed. Payment instructions delivered to Postfinance in this way are converted into a digital image and then transmitted to the payee. The obligations between Postfinance and the banks arising from such payment instructions are settled in SIC on an aggregated basis, whereas the information pertaining to the transaction is transmitted in various formats.

Customers have different possibilities for settling their bills. First, payment instructions can be sent by mail. Second, customers can submit their payment instructions through the internet. Third, banks and Postfinance provide payment services at the counter to their account holders. Only Postfinance allows non-account holders to effect payments in cash at the counter.

Swiss Post also offers a facility whereby the beneficiary can be paid the due amount at home by the postman. This used to be fairly common procedure with state pensions, although this service has become less important in recent years.

2.2.3 Direct debits

In 2000, the number of direct debit transactions by the banks and Postfinance amounted to 46 million, with a total value of CHF 70.8 billion. The direct debit procedure is mainly used for recurring payments, for instance, by credit card companies when they periodically bill cardholders or by insurance companies for the collection of premiums.

Consent of the debtor (payer) authorising a specific creditor (payee) to initiate debits (debit authorisation) is required before payments can be debited directly to his account. The creditor is responsible for obtaining the authorisation of the debtor. The creditor draws up the payment instructions on a data medium and sends it to Swiss Interbank Clearing AG for processing. The incoming data media are processed daily and the debtor's bank receives a list of payments to be made on data media or in paper-based form, according to choice. Since 1998, interbank obligations arising from such services have been settled in SIC. In certain cases, for instance where there are insufficient covering funds in the account or in the absence of the debit authorisation, debits may be rejected by the debtor's bank; the creditor is then responsible for recovering the amount due from the debtor.

2.2.4 Cheques

Cheques have never been widely used in Switzerland. Since 1989, the significance of cheques has continuously declined due to higher fees charged by the banks. An increasing density of cash dispensers and EFTPOS terminals may also have contributed to this decline. In 2000 a total of 11.2 million cheques were processed, amounting to CHF 27.7 billion.

Cheques drawn on banks are processed by the cheque centre run by Payserv Ltd. Cashed cheques are submitted by the banks daily to Payserv Ltd. In cheque processing the credit items for presenting banks and debit items for drawee banks are recorded on data media or in lists. Cheques normally remain with Payserv Ltd, where they are microfilmed. Postfinance also offers postal cheques.

2.2.5 Card payments

2.2.5.1 Credit cards

At the end of 2000 about 3.1 million cards were in circulation in Switzerland. The number of contracts between merchants and credit card organisations amounted to 303,000.³ Cardholders are normally charged an annual subscription fee, while merchants have to pay a commission based on the transaction value. Around 90% of outlets are equipped with direct lines to the authorisation centre. This allows for authorising a transaction automatically and simultaneously recording and transmitting the transaction data to the processing centre.

Transaction amounts are paid to the merchants periodically, typically by means of bank credit. Cardholders periodically receive a statement of transactions. The procedure for settling this bill is by means of a payment slip or by direct debit. Credit cards may also be used to withdraw cash over the counter at a bank or at cash dispensers. Use of this service varies because the cardholder is normally charged commission on each withdrawal.

2.2.5.2 Debit cards

Debit cards are issued by banks and Postfinance for their customers. Withdrawals by means of debit cards are debited to a cardholder's bank or post office account a day or two later. At the end of 2000 5.2 million debit cards were in circulation.

The debit card issued by Swiss banks is the EC card, which has a magnetic stripe enabling it to be used in EFTPOS systems and for withdrawing money from cash dispensers. For transactions at electronic terminals a PIN is used. Since 1997, every EC card has also been equipped with a chip so that the card may be used as a stored value card (e-money). Postfinance also issues the Postcard, which can be used with a PIN to withdraw money from cash dispensers, and in EFTPOS systems. Since it has the same chip as the EC card, the Postcard may also be used as stored value card.

2.2.5.3 Retailer cards

Various petrol companies, large retailers and retailers' associations issue their own cards, but these are valid only at their particular outlets. Customers normally receive a monthly statement of their purchases. No subscription fee is charged.

2.2.5.4 Cash dispensers

Switzerland has two cash dispenser networks in operation: the bank (Bancomat) network and the Postfinance (Postomat) network. Since autumn 1997, both the Bancomat and the Postomat networks have been made interoperable. In 1996 there were 3,654 cash dispensers in operation; by 2000 the number had increased to 4,866. In 2000, withdrawals amounted to 128.1 million transactions totalling CHF 25.3 billion.

The Bancomat and Postfinance networks operate online. Withdrawals from the Bancomat network may be made with EC cards and credit cards and also with bank cards from a bank's own cash dispensers. Additional facilities such as requests for statements of account and initiating payment orders are available only with a bank's own card at a bank's own terminals. With EC cards and credit cards up to CHF 1,000 a day may be withdrawn. The cardholder's PIN must always be entered in order to make a withdrawal. The verification of the PIN and other details is normally carried out centrally and online by the network operator (Payserv Ltd). Banks can also verify their own cards at their own cash dispensers and also process the transactions directly themselves. In addition, Bancomat and Postomat machines are equipped with a loading facility for stored value cards.

2.2.5.5 EFTPOS systems

There are also two independent EFTPOS networks, the bank network and the Postfinance network. However, the terminals installed may normally use both networks. A PIN must be entered. At the end

³ A merchant can accept cards of different credit card organisations. This total includes a merchant outlet twice if it accepts two different credit cards.

of 2000 there were a total of 141,032 EFTPOS processing possibilities at retail outlets and filling stations.⁴

2.2.5.6 *Electronic money*

On behalf of the Swiss banks, Europay (Switzerland) SA introduced the stored value card CASH in January 1997. The technology was adopted from the Belgian Proton System. CASH is a reloadable chipcard which is meant to substitute for currency, especially small amounts. The chip is attached to the EC card and to the Postcard. CASH is an account-related system. A maximum amount of CHF 300 per load can be transferred from the customer's account to the chipcard at every cash dispenser. In order to accept CASH at the point of sale, retailers have to install a terminal, which has, however, been offered with a rewarding price structure for early adopters. There are 3.4 million cash cards in circulation. In 2000, the number of purchase transactions was 18 million, with a value of CHF 67 million.

In 1998 Payserv Ltd started a project for credit card payments over the internet called SET (Secure Electronic Transaction). SET currently enables over 15,000 cardholders to make secure payments through the internet.

2.3 **Recent developments**

The banks have been working together for some time on preparing the introduction of an electronic bill presentment and payment (EBPP) facility called PayNet. Telekurs Holding, which developed PayNet, sold it to SAP AG in 2001. Telekurs, however, plans to market and operate PayNet in Switzerland in 2003 under licence from SAP. Yellowbill is the equivalent facility offered by Postfinance. EBPP facilities will enable the current procedures (ie paper invoices and payment slips are often sent together by mail) to be carried out electronically and in paperless form.

3. **Interbank exchange and settlement systems**

3.1 **General overview**

In Switzerland interbank cashless payments are executed via SIC, via retail payment systems such as DTA (a data media exchange facility) and LSV (a direct debit facility), and via cheque clearing. In addition to these systems, a giro system among the regional banks is operated under the auspices of RBA-Holding, an association of regional banks with over 80 members at the end of 2000. This system will not be dealt with any further here.

3.2 **RTGS: Swiss Interbank Clearing**

3.2.1 **General overview**

The role of SIC is to execute interbank payments in Swiss francs with immediate finality 24 hours a day with funds held at the SNB. It is a real-time gross settlement system, ie all payments are settled individually on the participants' accounts (debiting of the account of the bank issuing the payment instruction and crediting of the account of the receiving bank). In 2001 the message flow structure changed from a V- to a Y-architecture: the sending bank dispatches a payment message in the SIC system. At the same time, customer-relevant information relating to a transaction is no longer passed on to the SNB. Only after settlement does SIC send the payment message with confirmation of the settled payment to the receiving bank.

⁴ An EFTPOS terminal that processes debit card payments by Postfinance and the banks is counted as representing two processing possibilities.

The SNB oversees the SIC system, while Swiss Interbank Clearing AG, a subsidiary of Telekurs Holding Ltd, is under contract to provide the computer centre service. Private law agreements between these two parties and with the participating banks form the legal framework for the operation and further development of SIC. The contracts are supplemented by regulations and handbooks. Committees including representatives of the SNB and the participating banks submit changes and additions to the instructions and handbooks and take decisions on technical modifications to the application. All changes and additions require the SNB's approval.

3.2.2 Participants

Originally, participation in SIC was limited to banks domiciled in Switzerland and subject to supervision by the Federal Banking Commission. The only exceptions to this rule were domestic clearing organisations. Over the years, this policy has been increasingly challenged by developments in domestic and international financial markets. On the one hand, non-bank intermediaries have increasingly gained ground in financial markets and thus questioned the dominant role of banks in this area. On the other hand, globalisation of markets has brought about not only ever growing payment volumes, but also stronger competition among financial centres and associated cooperation and mergers between providers of financial market infrastructure. In the wake of these developments, conventional access policies have become outdated since these would particularly make cross-border projects such as the continuous linked settlement system (CLS) virtually impossible.

Against this background, the SNB decided, in 1998, to substantially liberalise its SIC access policy. For instance, it is now possible for supervised securities dealers such as non-banks to become SIC participants. More importantly, however, remote access to SIC is also granted to international joint ventures and clearing organisations, as well as the associated banks, provided these make a sizeable contribution to the reduction of systemic risks or are of major significance for the Swiss financial centre. For reasons of legal and operational security, this regulation only applies to joint ventures, clearing organisations, banks and non-banks from countries which have at least the same standards as Switzerland with respect to banking supervision, the fight against money laundering and the telecommunications infrastructure. At the end of 2000, 64 out of 306 SIC participants were so-called remote members.

Furthermore, Postfinance has been participating in SIC since 2000. As a large number of payment instructions, mainly retail payments, have to be transferred from the postal giro system to the bank giro system (and vice versa), Postfinance's participation in SIC has simplified the payment flows between the two systems. From a technical point of view, Postfinance sends its payments to banks through SIC in batches (ie payments to individual banks are added together). The information relating to these payments is, however, transferred via separate channels in various forms. The beneficiary then disaggregates the payments and credits customers' accounts according to the payment information.

3.2.3 Types of transaction handled

SIC is both a large-value payment system and a retail payment system; there are no value limits. In 2000 almost 150 million payments were executed, with a total value of approximately CHF 44.6 trillion. Moreover, the underlying transaction may be related to a bank's own business or be initiated by a customer. The bulk of payments is smaller than CHF 5,000. In terms of turnover, however, these small-value payments are negligible. Medium-sized payments between CHF 5,000 and 1 million account for about 17% of the total transaction volume. These payments generate about 4% of transfers in terms of turnover. Consequently, almost the entire turnover is accounted for by a small number of payments exceeding CHF 1 million.

The types of payments handled in SIC can be divided into four categories: (i) customer-related payments (transferor and transferee are non-banks), (ii) cover payments (sender and receiver are SIC participants), (iii) bank-to-bank payments (payments in which at least one of the parties is a bank that is not an SIC member), and (iv) service payments.

Customer-related payments account for about 86% of the transaction volume in SIC. But since customer-related payments are usually small-value payments, the amount in francs of these payments tends to be small. Cover payments generate 13% of the turnover. These payments are mostly related to interbank transactions such as money market transactions and foreign exchange transactions between SIC participants. More than two thirds of the turnover can be attributed to bank-to-bank

payments. These payments stem mainly from correspondent banking business and indicate the significance of foreign exchange transactions.

Service payments are related to the cash leg of securities transactions that are settled via the SIC-SECOM linkage and the settlement of obligations stemming from interbank payment services such as data media exchange or direct debiting. The share of service payments in terms of turnover has been increasing continuously. This increase can be attributed to two factors. First, settlement of the various retail payment systems has been integrated into SIC in the course of the last few years. Second, the repo platform was introduced in 1998. The sharp increase in repo transactions is mainly related to the fact that repos have become the main instrument of the SNB's monetary policy operations.

3.2.4 Transaction processing environment

Every bank is connected to the SIC system via the network run by Swiss Interbank Clearing AG. This network is available not only for SIC but also for other services provided by Telekurs Holding Ltd. The connection has been set up via the bank's own mainframe or a front-end computer; terminal connections are not permitted. All payment instructions must be authenticated using special equipment in order to prevent illicit insertion or alteration. However, encryption of transmissions is optional.

In case of technical problems at either individual participant level or system level, a number of backup procedures exist that provide for the possibility of timely settlement of payments. In particular, there are several measures to maintain the operability of the central SIC computer. For instance, emergency generators exist in case of a breakdown of the external power supply. A hot standby site is located about 20 km from the main site. Furthermore, in an emergency or in case of serious software problems, there is the additional alternative of switching to the so-called Mini-SIC, an offline batch application that can be run on any mainframe computer.

With respect to the SIC system's capacity, several concepts have to be distinguished. First, capacity in terms of entering payments (including validation) is limited to about 150,000 transactions per hour. However, once these payments are entered, up to 700,000 transactions per hour can be settled. Finally, the capacity for sending out notifications of settled payments to receiving banks is about 250,000 transactions per hour. Thus, given the fact that payments can be entered around the clock, these figures allow the extrapolation that theoretically about 3.6 million transactions per day could be settled in SIC. On peak days, about 2 million transactions are processed.

3.2.5 SIC operation

The prerequisite for participation in SIC is a reserve account at the SNB and an online connection to the central SIC computer. Payment instructions can be submitted for the same day value or for settlement up to five bank business days hence.

(a) Account structure

A specific feature of SIC is the account structure. Each participant's reserve account at the SNB is split into an SIC account and a master account. At the beginning of an SIC day, all reserve balances are held on the master account. To start the settlement cycle, funds are transferred (by the SNB) to the SIC accounts. Since cash withdrawals are settled on the master account, banks usually leave a certain amount of reserves on their master account. During the SIC day, settlement of interbank funds transfers occurs on the SIC accounts. Funds can be moved at any time from one account to the other. Finally, at the end of the day, total credits and debits of the SIC accounts are transferred to the master accounts. These end-of-day giro balances on the master account are relevant for accounting purposes.

(b) Queuing and settlement mechanism

The transfer of funds in SIC is subject to the strict condition that the bank issuing the transfer order holds adequate balances on its SIC account. In the event of insufficient coverage, the transfer order is automatically held pending until covering funds have accumulated in the account through incoming payments. The system automatically retries to settle pending payments. Within a specific order of priority, the FIFO rule applies. In a first step, for each account the next payment of the highest existing priority is determined. If there are sufficient funds available this payment is marked as a "settlement

candidate". Since there are many different accounts, it is very likely that there will be a large number of settlement candidates. Therefore, as a second step, among all the settlement candidates the algorithm selects the one that has the earliest input time. This payment is then settled. Having settled the settlement candidate or - if possible - a package of payments, the settlement algorithm starts again with the first step, and so on.

Additionally, the queuing mechanism in SIC is equipped with an automated optimisation routine that allows for bilateral offsetting. If there is a gridlock, the system starts after a few seconds to search at the top end of the queue for cross payments (from sender and receiver banks). If there is such a case, these two payments are netted, provided, however, that the cover rule is respected.

From an individual participant's perspective, the queue management is limited to the possibilities of cancelling and re-entering payment orders. The receiving bank is notified of any cancellations since it has real-time access to all data relating to its own account. Cash managers can thus continuously track current account balances and the amount of pending incoming and outgoing transfers. A cancellation signifies a reduction in these pending items. The information on pending payments becomes increasingly important towards the end of an SIC day, when liquidity managers have to decide whether, and to what extent, money market transactions are to be effected in order to have sufficient funds for carrying out pending payments or to bring reserve account balances in line with the desired level. The SNB, for its part, has access to all banks' transaction data stored by the system.

(c) Timing of the settlement cycle

SIC operates round the clock on bank business days. Settlement is carried out for approximately 22 hours. The day begins at 6 pm on the day before the bank business day in question with the transfer of giro balances from the master accounts at the SNB to the SIC accounts. The day ends in three stages on the bank business day in question. 3 pm is cutoff time 1. From this moment on, payments submitted for same day settlement are automatically changed to the value of the next bank business day. The only exception is the provision of cover, which can be submitted up to cutoff time 2 (4 pm) for same day settlement. After cutoff time 2 only payments submitted by the SNB are accepted for same day settlement. The end-of-day processing starts at 4.15 pm. These are set times, but in exceptional situations (eg in the event of computer or transmission failures) they can be postponed by the SNB. At the end of the day, totals of debit and credit transactions are transferred from the SIC accounts to the master accounts at the SNB.

The purpose of the hour's difference between cutoff time 1 and cutoff time 2 is to give banks with queued payments, ie with insufficient funds, the time needed to acquire the necessary covering funds on the market or from the SNB. In the quarter of an hour between cutoff time 2 and the start of day-end processing, only lombard (see Section 3.2.7) loans can be accepted. During the end-of-day processing, all the payments which are still queued, ie the settlement of which has not been possible, are deleted; they must be resubmitted the next day.

Pending payments which are cancelled after cutoff time 1 without the consent of the receiving bank or which are deleted during day-end processing are subject to a penalty of 500 basis points above the current money market rate. The receiving bank is entitled to claim this penalty from the bank which issued the payment instruction. The latter is obliged to pay this penalty without delay, irrespective of any further claims by the receiving bank.

3.2.6 Credit and liquidity risk and their management

(a) Credit risk

Credit risks arise if a receiving bank acts upon information available about pending incoming payments.⁵ In this case the receiving bank would de facto be extending credit to the sending bank (intraday or even overnight). However, the fact that the initiating bank can, at any time before clearing stop 1, cancel pending outgoing payments or payment orders for a later value date and that at

⁵ Information which the system gives to the receiving banks concerning pending payments is not legally binding and, as expressly laid down in the regulations, is not to be regarded as a binding assurance that funds will be transferred.

day-end pending payment orders are automatically deleted by the system helps to limit such behaviour.

(b) *Liquidity risk*

Payments which are still held pending in a queue file at the end of the day are automatically deleted by the system. The receiving bank therefore cannot assume that queued payments will be settled in every case. However, the staggered close of the clearing procedure, with cutoff times 1 and 2 and the time in between, gives banks the opportunity to acquire the necessary liquidity on the interbank market or in the form of lombard loans from the SNB.

3.2.7 Provision of credit facilities

Until recently, SIC was one of the few pure queuing systems. The SNB did not allow any overdrafts nor did it provide any collateralised intraday credits. Despite the well known argument that an RTGS system without any form of intraday liquidity would imply substantial liquidity costs for participating institutions, SIC operations generally ran fairly smoothly. Due to a liquid money market and sophisticated liquidity management by some market participants, the banks were able to gradually reduce their reserve balances. However, since October 1999 the SNB has been placing interest-free intraday credit at the banks' disposal. This change in policy was motivated mostly by an increase in time-critical payments. In particular, the future introduction of the CLS system for settling foreign exchange transactions will trigger an additional need to settle potentially very large payments without delay. Also, intraday credit from the central bank has the benefit of leading to shorter queues and earlier finality.

The link between SIC and SECOM (see Section 3.2.9) allows a very efficient and completely secure mechanism for granting intraday credit by means of intraday repos. Moreover, the use of intraday repos enhances the attractiveness of the repo platform for small domestic and for foreign financial institutions.⁶ This, in turn, raises the number of potential counterparties for the SNB's regular money market operations and thus facilitates the implementation of monetary policy. In the light of the Swiss money market structure, which is characterised by the dominance of a small number of large commercial banks, this argument is of particular importance.

For the time being, there are two time windows during which banks may draw on intraday credit: at the beginning of an SIC value day at 6 pm and at 8 am.⁷ Moreover, between 8 am and 2.45 pm banks may obtain further intraday credits on request. The banks can choose the time of the repayment themselves, but it has to be completed by the end of the settlement day. If an intraday credit is not repaid in time, a penalty rate exceeding the overnight rate by 400 basis points is applied.

The second form of credit extension provided to the banks is overnight money in the form of lombard loans. They are available only against pre-pledged collateral and at a rate of interest which is at present 200 basis points above the overnight rate. Lombard loans serve as short-term bridging liquidity.

3.2.8 Pricing policies

Prices are set at a level at which the expected SIC operating costs, including costs in respect of the Telekurs network and all line charges, are covered by the expected volume of transactions. If there are substantial discrepancies, prices can also be adjusted in the course of the year. Prices are set per transaction and charged to SIC participants. It is left up to each bank to decide whether and to what extent to pass charges on to its customers.

In 2000, the receiving bank paid a flat rate fee of CHF 0.06 per transaction. The sending bank pays a fee based on the sum of two components, one of which depends on the time of initiation and the other

⁶ The repo platform, also called Eurex repo, is the trading platform for Swiss franc repurchase agreements.

⁷ To be more precise, the first intraday repos are concluded at 4 pm but the liquidity is only provided after the beginning of the new SIC value day (an SIC value day starts at around 6 pm on the previous calendar day).

on the time of settlement. In addition, the fee partly depends on the size of the payment. The following table shows the prices valid for 2002.

Fee structure for the sending bank in 2002¹				
(in CHF)				
	Less than CHF 100,000		More than CHF 100,000	
	Input	Settlement	Input	Settlement
Before 8 am	0.01	0	0.01	0
8 am to 11 am	0.02	0.06	0.02	0.06
11 am to 2 pm	0.11	0.15	0.24	0.84
2 pm to 4.15 pm	0.40	0.40	1.00	2.00

¹ The receiving bank pays a flat fee of CHF 0.06 per payment. (Example: for a payment amounting to less than CHF 100,000 that is presented before 8 am and settled after 2 pm, the sending bank pays CHF 0.41.)

Besides the principle of cost recovery, the fee structure is conceived to make the input and settlement of payments at an early point in time worthwhile. Due to progressive fees, participants have an incentive to enter and settle their payments as early as possible. Moreover, it becomes more expensive to wait for incoming payments and thus to profit unfairly from opportunity cost bearing reserve funds of other banks. Furthermore, different fees are applied to small and large amounts, the latter consisting of CHF 100,000 or more. The fee structure provides an incentive for early input and settlement of small payments, which represent the bulk of SIC transactions. This, in turn, prevents the demand for input and settlement capacity to peak towards the end of a settlement day, ie at times when the occurrence of a gridlock would pose a major concern. Due to the progressive fee structure and the fact that payments larger than CHF 100 million are generally split into a number of tranches, gridlocks have never been a major problem in SIC - even before the introduction of the intraday credit facility.

3.2.9 Links with other systems

In March 1995 a link between SIC and the securities settlement system SECOM of SIS SegalInterSettle (formerly SEGA) was established. The link allows a real-time delivery versus payment mechanism in securities settlement by settling both the cash and the security side on a trade by trade (gross) basis. This eliminates principal risk in securities transactions. Furthermore, when the Swiss Stock Exchange switched from an open outcry system to an electronic trading platform in 1996, the new trading system SWX was linked to both SIC and SECOM. This linkage allows straight through processing from trading to settlement. In addition, cash flows resulting from Eurex, the Swiss-German derivative exchange, are also settled in SIC.

Ever since the early stages of planning, the objective has been to eventually provide for the settlement of various retail payment systems in SIC and thus to submit them to cover control. In May 2000, this process was completed by the integration of the settlement of cheques. Other retail payment systems that are settled in SIC comprise data media exchange (DTA), direct debits (LSV), cash withdrawals at ATMs, EFTPOS transactions (EC-direct) and transactions with prepaid cards (CASH). Interbank claims which arise from these systems are settled as debit payments on a gross basis at regular intervals - generally once a day - on the participants' SIC accounts.

3.3 Retail payment systems

3.3.1 The data media exchange facility (DTA) and direct debit procedure (LSV)

These systems enable payment instructions from bank customers to be processed electronically. Payment instructions are submitted by bank customers on diskettes, cassettes or magnetic tapes or

via file transfer to Payserv Ltd. At the same time the issuer of the payment instruction sends his bank a payment order (data media exchange) or a collection order (direct debit). The bank can then authorise Payserv Ltd to process the data.

The deadline for accepting electronically transmitted data is 2 pm for payments to be settled in SIC on the next bank business day. Subsequently, the payment instructions are processed, with calculation of the total credits and debits for each bank and delivery of the payment records to each bank. Once processing is terminated, the totals are transmitted to SIC for settlement. At 8 pm the output is ready for the banks.

3.3.2 Cheque clearing

Central cheque clearing is used for the processing of Swiss standard cheques, which takes place at Payserv Ltd. The bank at which the cheque has been cashed presents the cheque to Payserv Ltd, which microfilms and retains it. Swiss standard cheques must reach Payserv Ltd by 10.30 am for same day processing. After cheques have been processed, each bank receives the relevant details on data media and the totals for each bank. Settlement occurs on an aggregate basis in SIC.

4. Securities settlement systems

4.1 General overview and recent developments

4.1.1 Markets in Switzerland

Switzerland has well developed securities markets in Swiss corporate and government bonds, domestic and international equities, and money market instruments. There is also a highly developed market for derivative products. The most active participants in these markets are domestic and international banks and securities dealers and brokers, as well as institutional investors such as pension funds and insurance companies.

The SWX Swiss Exchange (SWX) offers trading services for a wide range of equity products such as Swiss and foreign equities, investment funds, rights, and warrants on equities and indices. Additionally, SWX lists Swiss franc bonds, Swiss and foreign Swiss franc convertibles and warrants on bond issues. SWX concentrates on the most liquid eurobond segments, ie bonds denominated in US dollars and euros. Incidentally, SWX is also proving its multicurrency capability with SWX Eurobonds (international bond issues) denominated in US dollars, euros, pounds sterling and yen. The SWX New Market is a segment of SWX especially designed for rapidly growing companies both from Switzerland and abroad. It provides these firms with a simplified means of entry to the international Swiss capital market.

All Swiss blue chips are traded through virt-x, a joint undertaking between the UK-based Tradepoint Exchange, the Tradepoint Consortium and SWX. Moreover, virt-x provides trading in pan-European blue chips of all major European indices. virt-x uses the electronic trading platform developed and used by SWX.

There is also a large volume of OTC activity in derivative products in Zurich. Standardised derivative products are traded through Eurex, the Swiss-German derivative exchange. Eurex provides its members and their customers with access to the complete European benchmark yield curve, from one- and three-month money market products based on Euribor to the long-term Euro Buxl future. Futures and options on futures for the Euro Bund, Euro Bobl, Euro Schatz and CONF are also traded on Eurex. In addition to options on German, Swiss, Finnish, Dutch, Italian, French and US stocks, futures and options on the German (DAX® and NEMAX 50®), Swiss (SMI®), Finnish (HEX25®) and European (Dow Jones STOXX 50SM and Dow Jones EURO STOXX 50SM) indices can be traded through Eurex. Eurex also launched futures and options on the Dow Jones Global Titans 50SM Index. Also available are futures contracts on Dow Jones STOXX 600SM, and options and futures contracts on Dow Jones EURO STOXX SM sector indices. The new products cover the euro zone and European area, respectively, in banking, technology, telecommunications and healthcare sectors. Finnish stock options as well as futures and options on the Finnish stock index began trading on the

Eurex platform as a result of a cooperation agreement between Eurex and the Helsinki Exchange (HEX). Enhanced product availability has also resulted from the launch of the a/c/e platform. Both CBOT® and Eurex products are now available on one liquidity network using the same technology. The a/c/e platform is operated as a joint venture together with the Chicago Board of Trade. In summary, Eurex provides participants with the most important worldwide index products, equity products, money market products and capital market products.

The repo market in Swiss francs was launched in 1998. Swiss and foreign participants can carry out their funding and collateral management operations directly on the interbank market as well as through the daily auctions of the SNB. Integrated clearing and settlement is the basis for secure, fast and cost-effective execution. Unique in the electronic repo environment, intraday contracts enable both national and international participants to organise their intraday liquidity management in Swiss francs in accordance with their particular needs. In March 2001, equity-repo trading with Swiss blue chips was initiated. With the introduction of the expanded facility, Eurex opened up the repo platform for collateralised funding business. With this, Eurex leads the way in consolidating the collateralisation of money market transactions. The introduction of a fully electronic primary and issue market represents a further modernisation of the Swiss financial centre. Auctions of new issues, which have so far been conducted mostly by phone and fax, as well as subsequent trading in the secondary market, can now be executed more efficiently. The Swiss Federal Finance Administration and the SNB have decided to use this platform for their auctions.

4.1.2 Swiss market infrastructure and its regulation

The Swiss Federal Act on Stock Exchanges and Securities Trading covers the exchange and clearing house operations of SWX and also provides the legal basis for self-regulation. Granted by the Federal Banking Commission (FBC), authorisation requires self-regulation. Within this legal framework, SWX provides a trading and matching platform for Swiss and foreign securities. It switched from an open outcry system to a central electronic system in 1996. Since June 2001, all Swiss as well as most pan-European blue chips can be traded on virt-x, which is under the supervision of the Financial Services Authority (FSA) and has been granted Recognised Investment Exchange (RIE) status.

Eurex was created by Deutsche Börse AG and SWX in December 1996 and founded through the merger of DTB Deutsche Terminbörse and SOFFEX (see Section 1.3.7). Both parties agreed to develop and implement a single platform for their derivatives markets and trade a harmonised product range. The operational and technical merger of the two markets was completed in September 1998, when all SOFFEX and DTB participants united on a common trading and settlement platform and the newly established Eurex clearing house commenced its activities. Eurex Clearing AG is a German registered corporation and its activities, like the exchange operations of Eurex in Germany, are subject to the provisions of the German Stock Exchange Act. The German Financial Supervisory Authority (BAFin) is the competent supervisory institution. Eurex AG is also subject to the legal supervision of the Ministry of Economics of the State of Hessen. The exchange and clearing house operations of Eurex in Switzerland are covered by the Swiss Federal Act on Stock Exchanges and Securities Trading. The legislation is the basis for self-regulation for Eurex (as for SWX).

FSG Swiss Financial Services Group (FSG) is another cornerstone of the Swiss market infrastructure. This holding includes SIS SegalInterSettle AG (SIS) as the most important subsidiary of FSG with regard to the Swiss market infrastructure. SIS is not only a national central securities depository (CSD), but also offers a broad range of cross-border services. SIS provides the securities settlement platform SECOM. This system allows for simultaneous, final, irrevocable delivery versus payment on an RTGS basis (real-time DVP model 1). All trades are matched and confirmed electronically on a real-time basis. SIS enjoys the status of a bank and is therefore supervised by the FBC.

SIC is an RTGS system operated by Swiss Interbank Clearing AG, a subsidiary of Telekurs Group, and is overseen by the SNB. The cash leg of securities operations in Swiss francs is settled in SIC. The banks' and brokers' SIC accounts are funded with central bank money from the reserve accounts that participants hold with the SNB. SIC AG was instructed by the Swiss financial community to develop a link to TARGET to settle payments in euros. For this purpose, it established the Swiss Euro Clearing Bank (SECB) in Frankfurt am Main. SECB operates euroSIC, a payment system linked to RTGS^{plus}, the German RTGS system connected to TARGET. Thus, for Swiss financial market participants euroSIC constitutes a link to the other European payment systems and provides an efficient cross-border gateway for payments to and from other European payment systems. euroSIC

operates on the basis of the software developed for SIC and runs on the same platform. As a German bank, SECB comes under the supervision of the Deutsche Bundesbank.

4.2 Trading, clearing and settlement

4.2.1 SWX

Trading

SWX has an electronic platform which ensures fully automated trading, clearing and settlement of all securities transactions. Electronic trading begins with the investor: participant banks' investment advisors register incoming orders from their customers in their trading system. These data are forwarded to the trader and checked, or fed directly into the trading system by the trader. From here, they are routed to the central exchange system of SWX, which acknowledges receipt of the order, assigns a time stamp to it and verifies its formal correctness. In the fully automated exchange system used at SWX, buy and sell orders are matched according to clearly defined rules (so-called matching rules). Regardless of their size or origin, trading orders, according to the SWX trading organisation, are executed on a price/time priority, ie in the order of price (first priority) and time received (second priority).

Exchange at SWX is divided into four periods: pre-opening, opening, continuous trading, and close of trading. Pre-opening starts at 5.30 pm on the previous business day and lasts until 10 pm. It resumes at 6 am on the current business day. Orders (bids and offers) may be entered or deleted in the electronic order book during pre-opening times, but no actual trades are made. A theoretical opening price is continuously calculated and displayed for the guidance of traders. The opening period determines the opening price and executes the orders according to the matching rules. This procedure takes place at 8.30 am for Swiss government bonds, at 9 am for stocks, at 9.15 am for derivatives and at 9.30 am for eurobonds, all other bonds and all other interest rate options. In order to establish the opening price (or upon resumption of trading after an interruption), the highest-execution principle is used; in other words, the price is fixed in such a manner as to achieve the largest possible turnover. After the opening period, continuous trading begins. New orders are continuously matched with existing ones. The matching rules are also applicable here. All orders are stored in the order book until a counterpart is found. Close of trading, which determines the daily closing price, starts at 5.20 pm and stops at 5.30 pm.

Clearing and settlement

SWX offers a securities exchange with a fully integrated electronic trading, clearing and settlement platform in which each trade triggers an automatic settlement. SECOM, SIC and euroSIC are linked to this comprehensive network. SIS operates the real-time settlement system SECOM, through which clearing instructions from SWX are automatically passed on for further processing on the settlement day. Depending on the settlement currency, transactions are routed via SIC or euroSIC. SIC and euroSIC ensure efficient and secure payment transfers in Swiss francs and euros respectively. Transactions in other currencies, as well as those in Swiss francs and euros on a credit basis, are settled directly via internal SIS accounts.

The purchaser and the seller undertake to settle all finalised on-exchange trades on the day fixed by SWX. The data are then transmitted from the SWX electronic trading system to the SECOM system. The data is entered by dealers when the order is recorded in the trading system, and the SWX system automatically makes any necessary adjustments. SIS debits the purchaser's SIC account with the agreed purchase price on the due date via a direct debit, and the corresponding amount is credited to the seller. At the same time, the securities are transferred - also automatically - from the seller's SIS custody account to that of the purchaser.

4.2.2 virt-x

Trading

virt-x provides a single open architecture platform which provides efficient, low-cost trading and straight through processing of trades from trading to settlement in European equities. The SWX

trading platform is used by virt-x. The aim is to implement automated securities trading, clearing and settlement at a European level.

virt-x is available for trading on all TARGET days, as specified by the European Central Bank. The operating hours of virt-x are 6 am to 10 pm. The trading hours are 9 am to 5.30 pm. The trading currencies are euros for euro countries and domestic currencies for the United Kingdom, Switzerland, Sweden, Norway and Denmark. Pre-opening starts at 5.30 pm on the previous business day and lasts until 10 pm. It resumes at 6 am on the current business day. Orders may be entered or deleted in the electronic order book during pre-opening times, but no automatic execution occurs during this period. A theoretical opening price is continuously calculated and displayed for the guidance of traders. The exchange confirms the member's order entry by order confirmation.

The opening period follows the pre-opening order book management period. During the opening period members may enter, modify or delete orders. No automatic execution occurs during this period. The market participants receive information on the situation in the public order book. All orders that are still valid from the previous day or which were entered on the trading day participate in this auction unless their execution is voluntarily restricted by the market participant. All executable orders are matched in the opening auction (uncrossing of the book). The beginning of price determination is random within a specific time interval, following the auction call, set by the exchange. The call has a random end in order to avoid price manipulation. At the end of the random minimum period the order book is frozen momentarily while the matching algorithm is run. No additional orders may be added or deleted until the matching process for that security is complete; incoming orders or deleting instructions are queued during this time and executed as soon as matching is completed. After price determination is concluded, the participants whose orders are, in part or in full, executed, are informed by a message confirming each execution that has occurred and giving all relevant trade information. The opening price is computed according to the highest-execution principle; in other words, the price is fixed in such a manner as to achieve the largest possible turnover.

Once the price determination process for each security has been completed, continuous trading in that security begins and orders can be entered, modified and deleted as before. All non-executed orders from the opening auction are forwarded to continuous trading unless otherwise restricted by the market participant. Thus, incoming orders are checked for matching against orders already in the book. All orders are stored in the order book until a counterpart is found or until they expire according to the parameter entered by the member. Close of trading, which determines the daily closing price, starts at 5.20 pm. The closing auctions stop at 5.30 pm.

Clearing and settlement

The virt-x market has been designed to have a single rule book and a fully integrated clearing and settlement system so as to gain the full efficiency benefits of a pan-European blue-chip equity market, namely maximum cost and productivity savings. Rather than dealing with the rules and settlement systems across Europe's 16 national equity markets, virt-x intends to offer its members the benefit of a single rule book and post-trade infrastructure covering trading and settlement for all blue-chip securities.

CRESTCo, Euroclear and SIS have developed fast and reliable links to provide a "virtual" single settlement system, offering virt-x members integrated, real-time, inter-CSD settlement at domestic rates. Whilst this infrastructure is a collaboration, the CSDs are also in competition, with each providing its own services. Members can choose a single CSD, or a combination of CSDs, to meet their settlement requirements. Through its own real-time link to the settlement system, virt-x is able to deliver settlement instructions for trades matched at the exchange to the relevant CSDs. This straight through approach minimises the possibility of post-trade uncertainty and potential delay and ensures high settlement rates. All order book trades are dealt for a uniform T+3 settlement period (subject to central bank holidays). The buyer is able to ask virt-x to enforce settlement if the seller has not delivered by the intended settlement date +2.

The London Clearing House (LCH) shall become the central counterparty for virt-x members in 2002. LCH will confer considerable member benefits, including full risk management, maintenance of anonymity from trade to settlement and optional netting. The virt-x integrated settlement solution is based on the cooperation of three interlinked CSDs. Each depository is able to support the settlement of all its customers' trades. Members may choose through which depository they wish to settle each jurisdiction of security. Thus members may employ one, two or a combination of all three CSDs to settle their virt-x transactions. Each depository maintains its unique service offering, facilitating

settlement between each other by real-time links. Each depository has provided an outline service description.

4.2.3 Eurex

Trading

Eurex operates a fully electronic platform on which trading takes place in three different phases. The pre-trading period is the initiating phase, during which users may make inquiries or enter, change or delete orders and quotes in preparation for trading. On the basis of the orders and quotes entered, a preliminary opening price is displayed. During the pre-trading phase, traders are in a position to assess supply and demand, and thus to determine their opening offers for prices of option series or futures contracts. During the so-called netting phase, Eurex counts up all the orders and quotes which have been entered, determining in this way the final opening prices of options series and futures contracts. The auction principle (ie highest-execution principle) determines the price.

Trading continues throughout the trading period. This is the actual trading phase, in which orders and quotes are matched and transactions are immediately confirmed online. During the trading period, all the trading functions are at the user's disposal. Trading ends with the post-trading period, where all inquiry functions are available and market, limit or stop trades for the next day may be entered. Stock market participants can enter these orders and quotes in the system for two hours after the trading period ends. All the inquiry functions are available during the so-called post-trading phase.

Market orders are matched immediately at the best available market price. Hence, with market orders, there is no guaranteed trade price. In options trading, market orders are matched as soon as possible at the best possible price. Market orders that cannot be executed are written to the order book until further quotes or tradable limit orders arrive. A market order is tradable when there are two opposite limit orders, which can both be executed, ie with a buy limit equal to, or higher than, the sell limit (crossed book). In futures trading, market orders are matched as soon as possible at the best possible price, but only within a maximum range around the last trade price. The size of the range is product-specific and determined by Eurex to make sure that market orders are only executed within an adequate range around the last traded price. Market orders that cannot be executed immediately are written to the order book.

The matching algorithm conforms to the price and time priority rule. This matching algorithm is basically used for all products. When a new order is entered, Eurex first checks the limits of the orders in the electronic order book and executes the orders with better limits before the orders with worse limits. A time stamp is assigned to all orders entered into Eurex to determine the chronological priority of the order for matching purposes. This time stamp is used to prioritise orders in the book with the same price. Market orders have the highest priority for matching. Since the purpose of the market order is to be carried out as quickly as possible at the best possible price, it must be entered without execution restrictions. In the case of limit orders, orders with the best possible prices (ie highest price limit for buy orders and lowest price limit for sell orders) take precedence in the matching process over other orders with worse prices.

When matching against an incoming order, the pro rata allocation algorithm takes into account each book order at the inside market price according to its percentage in overall volume, regardless of its time stamp. The elimination of time priority results in a larger number of orders contributing to a trade, since an incoming order is partially matched against a proportion of all orders at the current inside market price in the book.

Clearing and settlement

With its expansion to enable cross-border settlements and multicurrency clearing, Eurex now acts as the counterparty for the buyer and for the seller in every transaction and guarantees both parties to the transaction that the opening contracts will be performed. Therefore, the two parties to a contract are able to make their decisions independently of each other and to concentrate on the respective counterparty risk of Eurex only.

Every exchange participant admitted to trading at Eurex is required to participate in the clearing process of Eurex. The participant can choose to participate as a general clearing member (GCM), a direct clearing member (DCM) or a non-clearing member (NCM). GCMs and DCMs are both referred to as clearing members. NCMs are exchange participants without a clearing membership. Every type

of participation entails different duties and requirements. GCMs can trade on the exchange and perform the clearing for their own transactions, their clients' transactions and the transactions of exchange participants who do not have a clearing licence (ie NCMs). Moreover, GCMs are obliged to provide margin to Eurex, to guarantee and perform the delivery for all exercises and all assignments and to guarantee the cash settlement resulting from their own positions and transactions as well as those of their clients and NCMs. DCMs can clear their own transactions, those of their clients and affiliated NCMs.

Eurex was the world's first exchange to expand its remote membership policy and facilities, already valid for trading, to clearing. So-called remote clearing was introduced in August 2000. Participants from every country in the European Union and from Switzerland are not only able to participate in trading directly; they are also able to clear transactions themselves. At the end of 2000, there were 428 participants in Eurex.

Transactions in Swiss and German securities are settled on a delivery versus payment basis through SIS or Clearstream Banking Frankfurt. Both CSDs have set up omnibus accounts and established a cross-border DVP link. In addition to securities, clearing and settlement facilities, they also offer clearing members facilities for deposits of collateral. With the introduction of physically deliverable foreign currency products, a securities account is planned for the delivery of foreign securities. Cross-border cash settlements by Eurex are processed through the Landeszentralbank Hessen in Frankfurt am Main and euroSIC for euros, SIC in Zurich for Swiss francs and Clearstream Banking Frankfurt for other currencies. Physical deliveries of securities are made upon instructions of Eurex to Clearstream Banking Frankfurt or SIS.

4.2.4 SIS SegalInterSettle

FSG Swiss Financial Services Group (FSG) - owned by the Swiss banking community - includes SIS SegalInterSettle AG (SIS) as the most important subsidiary with regard to the Swiss market infrastructure. SIS not only performs CSD functions, but also offers a broad range of cross-border services. SIS provides the securities settlement platform SECOM. This system allows for simultaneous, final, irrevocable delivery versus payment on an RTGS basis (real-time DVP model 1). All trades are matched and confirmed electronically on a real-time basis. SIS enjoys the status of a bank and is therefore supervised by the FBC.

All domestic and foreign securities listed in Switzerland or traded over the counter are eligible for SIS, such as: bonds issued by domestic and foreign institutions, notes, money market claims, warrants, Swiss bearer and registered shares, foreign shares listed in Switzerland. To this end, all securities are provided with an identification number. They are referred to exclusively by this number when transactions take place. At the end of 2000, the volume of securities held at SIS was 66,440. The value of securities amounted to CHF 2.1 trillion.

The following institutions are eligible to participate in SIS: institutions subject to the Swiss Banking Law, domestic and foreign brokers and finance companies, clearing organisations, and other categories of participants who satisfy the admission criteria. At the end of 2000, there were 383 participants in SIS. All SIS participants are linked to SECOM via an online interface, which can be set up either via a computer-to-computer connection or by using SIS's own low-cost PC-based MAX User Device (Maximal Access to Extended Settlement Services). SECOM operates 24 hours a day on bank working days. Incoming instructions are processed individually in real time. The buy/sell instructions received from the buyer/seller of a security are pre-matched. On the execution date the seller's safe custody account is checked to ensure that there is sufficient cover. If this is not the case, the transaction is put into a queue file and executed automatically as soon as the purchases completed bring the total securities holding in the safe custody account up to the required level. If the total securities holding is sufficient, the sold securities are reserved in the seller's holding. The procedure on the financial side is as follows:

For processing transactions in Swiss francs, SECOM has an online connection with SIC. Once the securities have been reserved, SECOM generates a payment instruction and sends it to SIC, which processes this payment instruction like any other, ie SECOM payments, too, are settled only if there is sufficient cover. After settlement the payment is delivered to SECOM, which can then release the reserved securities and finally debit/credit them to the seller's/buyer's account. In 2000, SIS processed a volume of 14.5 million transactions, with a value of CHF 5,760 billion.

SIS is in the process of setting up links to central securities depositories in Europe to ensure that participants in other markets can also benefit from straight through processing (STP). Currently, there are automated links to Clearstream Frankfurt (only for Eurex and OTC transactions), Clearstream Luxemburg and Euroclear (only for eurobond trades) as well as to CRESTCo and Euroclear (for virt-x trades). SIS and CRESTCo form The Settlement Network. Further links are planned. In addition, SIS has a network of correspondents in all major markets around the globe.

4.3 The use of the securities infrastructure by the Swiss National Bank

The SNB makes intense use of the securities infrastructure. The repo platform, which was introduced in 1998, is used by the SNB to conduct its monetary policy operations. Auctions are usually conducted on a daily basis. Since October 1999, the SNB has offered intraday repos through the same platform. The corresponding depository services are provided by SIS. In addition, like any bank, the SNB relies on the services provided by SIS for its other business activities.

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List of abbreviations

AIM	Alternative Investment Market
APACS	Association for Payment Clearing Services
BBA	British Bankers' Association
BCSB	Banking Code Standards Board
BSA	Building Societies Association
CDI	CREST Depository Interest
CDL	CREST Depository Limited
CGO	Central Gilts Office
CHAPS	Clearing House Automated Payment System
CMO	Central Moneymarkets Office
CSD	central securities depository
EuroCCP	European Central Counterparty
FOS	Financial Ombudsman Service
FMIRs	Financial Markets and Insolvency (Settlement Finality) Regulations
FSA	Financial Services Authority
FSMA	Financial Services and Markets Act
IBDE	Interbank Data Exchange
IPE	International Petroleum Exchange
ISD	Investment Services Directive
ISMA	International Securities Market Association
LCH	London Clearing House
LIFFE	London International Financial Futures Exchange
LME	London Metal Exchange
OMLX	OM London Securities and Derivatives Exchange
PPS	Protected Payments System
RCH	Recognised Clearing House
RIE	Recognised Investment Exchange
SEAQ	Stock Exchange Automated Quotation
SEAQI	SEAQ International
SEATS	Stock Exchange Automated Trading Service
SETS	Stock Exchange Electronic Trading Service
SFD	Settlement Finality Directive
SLRC	Stock Lending and Repo Committee
SME	small and medium-sized enterprises
USRs	Uncertificated Securities Regulations

Figures quoted in the text are in nominal terms.

All Bank of England publications referred to in the text are available on the Bank's website, <http://www.bankofengland.co.uk>.

Introduction

The allocation of responsibilities amongst the UK financial sector authorities has changed considerably in recent years. In 1997, the role of banking supervision was transferred from the Bank of England to the Financial Services Authority (FSA). On 1 December 2001, the Financial Services and Markets Act (FSMA) 2000 came into force, substantially replacing the previous regulatory framework for financial services and bringing the regulation of securities, banking and insurance under the supervision of a single regulator, the FSA.

Under the Bank of England Act 1998, the Bank has statutory objectives relating to monetary policy; these are to maintain price stability and, subject to that, to support the government's economic policy. It is also required by the 1998 Act to formulate and publish its objectives and strategy. In general terms the objectives (or core purposes) are to:

- maintain the integrity and value of the currency;
- maintain the stability of the financial system, both domestic and international; and
- seek to ensure the effectiveness of the United Kingdom's financial services.

These objectives are reflected in a memorandum of understanding between HM Treasury, the Bank and the FSA to establish the framework for cooperation between the three bodies in the field of financial stability following the decision to transfer banking supervision from the Bank to the FSA.

In the payments industry, the main private sector body is the Association for Payment Clearing Services (APACS), set up in 1985. APACS is a non-statutory association providing a forum for the major banks and building societies to discuss non-competitive issues relating to money transmission. Three operational clearing companies currently fall under the APACS umbrella: CHAPS Clearing Company; BACS Ltd; and Cheque and Credit Clearing Company Ltd.

Most high-value wholesale payments go through the CHAPS (Clearing House Automated Payment System) RTGS system. There is, however, no lower limit on transaction values, and the system can be used for low-value (retail) payments when same-day finality is required. The system offers two separate clearings - one denominated in sterling, the other in euros. CHAPS Sterling moved to RTGS in April 1996, having previously settled on an end-of-day net basis. On 4 January 1999, CHAPS Euro began operations, and connects to the pan-EU TARGET system. Member banks can thus route both domestic and cross-border payments through CHAPS Euro. Since August 2001, with the completion of the NewCHAPS project, CHAPS Sterling and CHAPS Euro have operated on a common (SWIFT-based) technical platform.

There are two retail-oriented payment clearing arrangements in the United Kingdom. The BACS system offers an ACH service handling electronic payment orders, whilst the Cheque and Credit Clearing Company processes paper items such as cheques and credit vouchers. For both these clearings there is a two-tier access structure with direct settlement members and "indirect" participants. Settlement between direct members occurs across accounts held at the Bank of England.

Plastic cards are widely used in the United Kingdom. Credit cards are predominantly issued through the Visa and MasterCard schemes, while the main debit card issuers are SWITCH and Visa debit. Virtually all ATMs are interconnected via the LINK network, which allows the customers of participating institutions to access their accounts from any of these institutions' ATMs.

The Bank of England's role in payment systems is fivefold. First, it is a full member and shareholder of the three main clearing companies and of APACS. Second, it maintains the RTGS processor that is used to apply real-time payments to settlement accounts held with the Bank. Third, in order to allow for the smooth flow of payments through the CHAPS system, the Bank provides the CHAPS banks with additional intraday liquidity through repo agreements. Fourth, the Bank maintains an active policy interest in payment systems. Finally, the Bank is responsible for the oversight of UK payment systems and as such for ensuring that sufficient weight is given to risk reduction and management in such systems' design and operation.¹

¹ The Bank's oversight role is described in *Oversight of Payment Systems* (Bank of England, November 2000).

In the United Kingdom, there are currently four major Recognised Investment Exchanges (RIEs) for securities. By far the largest is the London Stock Exchange, which operates order- and quote-driven markets in UK equities, international equities, UK government and commercial sterling bonds, eurobonds, medium-term notes, depositary receipts and exchange-traded funds. virt-x is an electronic stock exchange, operating an order-driven market in the majority of UK-listed securities and the largest European stocks. Coredeal MTS is a quote-driven market for benchmark corporate bond issues. Jiway, a hybrid order/quote-driven trading system, matching low-value buy and sell orders in a wide range of US and European equities, is part of the OM London Exchange (OMLX).

The United Kingdom has three Recognised Clearing Houses (RCHs): the London Clearing House (LCH), the European Central Counterparty (EuroCCP) and CREST.

LCH provides CCP services to the London International Financial Futures Exchange (LIFFE), the London Metal Exchange (LME), the International Petroleum Exchange (IPE), the London Stock Exchange (for trades on the SETS electronic trading platform) and for a limited number of contracts on the US-based Intercontinental Exchange. It also clears cash and repo transactions in a range of European government (including UK government) and supranational bonds and OTC interest rate swap transactions (with other instruments to be added to both services).

EuroCCP is the CCP chosen to clear for Nasdaq Europe, the pan-European stock exchange.

CREST is the United Kingdom's principal settlement system, and currently settles transactions in UK and Irish equities, government bonds and corporate fixed interest stocks held in dematerialised form. The system is operated by CRESTCo, a private sector company owned by a wide range of financial institutions operating in the securities markets. In 1999, control of the Bank of England's settlement systems CGO (for gilts and non-British government sterling debt) and CMO (for money market instruments) was transferred to CRESTCo, although the Bank of England continues to provide depository services for CMO instruments. Settlement of gilts and non-British government sterling debt was successfully absorbed into an enhanced CREST system in July 2000 and the CGO was closed; work is under way to integrate CMO instruments into CREST, thereby creating a single unified UK securities settlement system (SSS). CREST has also established links to other settlement systems in Europe and North America to enable transactions in foreign securities to be settled in CREST. In September 2002, a merger between CRESTCo and Euroclear was completed. The aim is to have a new settlement platform in place by 2005, although CREST members will for the time being access this platform using the system functionality currently available to them in CREST.

With the closure of the CGO and transfer of the CMO to CRESTCo, the Bank of England now has less direct involvement in trading, clearing and settlement. As well as being a participant in the money, bond and foreign exchange markets, the Bank also provides a settlement bank service for certain customers in CREST and the CMO.

1. Institutional aspects

1.1 The general legal and regulatory framework

The UK payment clearing systems described below have evolved through the actions of commercial institutions and are not, in the main, the subjects of specific legislation or regulatory provisions. The most widely used clearings in value terms are owned and controlled by their members through the clearing companies under the APACS umbrella.

All the settlement members of the APACS clearings are credit institutions authorised under the FSMA 2000, and they account for a very large proportion of the flows through these systems. The FSMA 2000 requires an institution to have prior authorisation before engaging in deposit-taking business in the United Kingdom. In addition, under the mutual recognition (or passport) regime of the Banking Consolidation Directive, credit institutions incorporated and authorised in other EEA Member States are given an automatic authorisation under the FSMA 2000 to carry out in the United Kingdom the activities listed in Annex I to the Directive. These passporting institutions are supervised for prudential purposes by the supervisory authority of their home state, and for the purposes of conduct of business regulation by the FSA.

There are principally four pieces of legislation that relate to the provision of payment services in the United Kingdom. The Bills of Exchange Act 1882 is a comprehensive codification of the previous law on bills of exchange, while the Cheques Acts, 1957 and 1992, modify the general principles of the 1882 Act as applied to cheques. More recently, the Deregulation (Bills of Exchange) Order 1996 allowed for the electronic truncation of cheques (see Section 3.4.4 below).

UK competition law relevant to payment systems is largely embodied in the Competition Act 1998. The United Kingdom's clearing systems and their membership criteria are (in addition to any EU competition law aspects) therefore subject to the provisions of this Act and the scrutiny of the Director General of Fair Trading in exercising the various powers available under that Act.

In December 2000, the government published a consultation document, *Competition in Payment Systems*, proposing that the Director General of Fair Trading should be given new powers aimed at promoting effective competition in payment systems for the benefit of consumers and businesses. The follow-up response to this consultation, published in August 2001, confirmed the government's intention to legislate. In the light of this, the United Kingdom's Office of Fair Trading set up a department to prepare for and administer any new regime.

The EC Directive on cross-border credit transfers was implemented in the United Kingdom by the Cross-Border Credit Transfers Regulations 1999, which clarifies the responsibilities of institutions participating in the sending, processing and receipt of cross-border credit transfers. This has been followed by an EC Regulation on the pricing of cross-border payments in euros, which was transposed into the national law of all EU member states in December 2001.

Moreover, the EC e-money Directives of September 2000 relating to the taking-up, pursuit and prudential supervision of issuers of electronic money have also been implemented in the United Kingdom. The FSA is the body responsible for supervising the activities of all e-money institutions.

In the United Kingdom, securities may generally be held in certificated or in uncertificated (or dematerialised) form. The Uncertificated Securities Regulations (USRs) 1995 provide for the dematerialisation of UK equities, and enabled the CREST book-entry transfer system to be introduced in July 1996. They were re-enacted with modifications in November 2001 as the USRs 2001. CREST is subject to regulation by the FSA, both as an RCH under the FSMA 2000 and as the operator of a relevant system under the USRs 2001.

Recognition of UK RIEs and RCHs is the responsibility of the FSA. Together with the four securities RIEs mentioned in the Introduction, LIFFE, the IPE, the LME and the OMLX are RIEs. LCH, EuroCCP and CRESTCo are RCHs. RIEs and RCHs are required to meet a range of criteria including maintaining adequate arrangements and resources for the effective monitoring and enforcement of their rules and, for RIEs, the provision of orderly markets. In return, they are exempted from many of the requirements applied to investment firms by the FSMA 2000.

Under Part VII of the Companies Act 1989, special protection is available for transactions carried out on RIEs and cleared through RCHs. Market contracts, the provision of margin, market charges entered into in connection with transactions on an RIE or RCH, and action taken under the default rules of an RIE or RCH are all protected from the adverse operation of certain provisions of insolvency law. The forms of protection provided for in the Companies Act were extended to cleared OTC transactions in 1998.

Similar protection is now accorded to payment and securities settlement systems, with the implementation in the United Kingdom of the EC Settlement Finality Directive (SFD) by the UK Financial Markets and Insolvency (Settlement Finality) Regulations (FMIRs) 1999. The protection under the FMIRs is conferred only upon those systems that have been formally designated under the regulations. The Bank of England is responsible for designating payment systems, and the FSA for designating securities settlement systems (SSSs). In the case of embedded payment systems - ie those SSSs through which payment transfer orders are also effected - the FSA is obliged to consult with the Bank of England. To date, the Bank of England has designated CHAPS Sterling, CHAPS Euro and, most recently, CLS. The FSA has designated CREST.

1.2 The role of the Bank of England

Statutory and oversight responsibilities

The Bank of England has a payment system oversight function which is recognised in its three core purposes and in a memorandum of understanding with the FSA and HM Treasury (see further the description of the Bank's objectives in the Introduction above). Reference has also been made in Section 1.1 above to the role of the Bank in relation to the designation of systems for the purposes of the SFD.

The Bank of England does not currently own any interbank payment networks, but it does operate the real-time processor at the centre of the NewCHAPS system. This processor also performs final settlement of the BACS system, the cheque and credit clearings and LINK. Nonetheless, the Bank has a major interest in the quality of interbank payment systems, for a number of reasons. First, the discharge of its responsibilities for the implementation of monetary policy and for the stability of the financial system in the United Kingdom presupposes reliable and efficient clearing and settlement procedures. Second, the Bank of England has a direct operational interest in the main clearings in its capacity as a member of the three clearing companies and of APACS. Third, the nature and extent of risks incurred by participants in payment and settlement systems, arising from both their own and their customers' transactions, are of interest to the Bank of England in its capacity as overseer of UK payment systems.

Banking activities

The Bank of England provides a range of banking services, including accounts and foreign currency payments, to a number of public sector bodies, UK and international financial institutions (including other central banks) and also its own staff. It also holds the settlement accounts of all the members of the APACS clearings, but there is no general requirement for other banks to hold operational accounts with the Bank.

Government departments are not, in general, obliged to hold accounts with the Bank of England. A number of major departments, however, do so in order to facilitate the efficient operation of central government banking operations. Moreover, the Bank of England acts as the clearing agent for the large number of government payable orders² issued through the Office of the Paymaster General (a government department with close links to HM Treasury), the Inland Revenue, the Board of Customs and Excise and National Savings and Investments.

1.2.1 **Provision of cash settlement facilities**

Use of Bank of England accounts for payment purposes

Members of each of the APACS clearing companies must have an account at the Bank of England in order to participate directly in the clearing and settlement process. Banks wishing to become members of one or more of these companies are required to formally apply to the Bank of England for a settlement account. The Bank also provides accounts to facilitate the settlement of obligations arising from clearings external to APACS, in particular the LINK network.

Settlement accounts held at the Bank of England are operated in real time. In the case of CHAPS Sterling and CHAPS Euro, individual credits and debits are applied to settlement accounts on a gross basis. Settlement of the other APACS clearings (and also LINK) is achieved by posting multilaterally netted amounts to these same accounts at specific times during the day. Each credit and debit applied to a settlement account is final and irrevocable from the time it is posted.

The Bank of England is currently in the process of formalising its policy regarding the provision of settlement accounts - see *Bank of England Settlement Accounts: A Consultation Document* (Bank of England, January 2002).

² These instruments are orders informing the payee that the public sector body issuing the order will pay the sum shown upon presentation thereof by a bank or building society; they are therefore similar to cheques.

Provision of credit facilities

The Bank of England has never given any explicit or implicit undertaking to underwrite the settlement operations of the UK clearings. See Section 3.2.5 below for details of the Bank of England's role in providing intraday liquidity.

Pricing policies

The Bank of England's charging policy in respect of its general banking operations is based on the principle of fully recovering the costs of the services it provides.

1.2.2 Provision of securities settlement facilities

The Bank of England has no specific statutory responsibility for the establishment or operation of settlement or clearing systems. Since the closure of the CGO in 2000 and the transfer of the CMO to CRESTCo in 1999, the Bank of England no longer provides settlement facilities for British government stock and money market instruments (see Section 4.4 below). Nor does it own or operate any clearing house facilities for equities, foreign exchange or derivative products. The Bank does, however, retain some functions related to registration of government stocks and also acts as a settlement bank in the CREST and CMO systems for a number of its customers.

1.2.3 Participation in other forums

The Bank of England is represented on a number of payments-related committees and working groups organised by the European Central Bank (ECB), the Bank for International Settlements (BIS) and the European Commission.

Domestically, the Bank of England is a member of the APACS Council, sits (as of right) on the Board of each of the three APACS clearing companies, and has a non-executive Director on the Board of CREST. In addition, the Bank has representatives in numerous groups such as the Stock Lending and Repo Committee (SLRC), which it chairs.

1.3 The role of other private and public sector bodies**1.3.1 Association for Payment Clearing Services (APACS)**

APACS was established in 1985 following a review of the organisation, membership and control of the UK clearing systems by the Child Committee, which was set up in 1984 by the banks then participating in the Bankers' Clearing House. The results of the review appeared in a report entitled *Payment Clearing Systems*, published in 1984 (the Child Report). The report's two main recommendations advocated a new structure for the organisation of payment clearing systems and new rules regarding membership of such systems.

Following this report, three separate companies were set up under the APACS umbrella to own and manage the clearings. The shareholders of these companies were the settlement members of the relevant clearings. Separating the clearings into three distinct companies allowed an institution to be a member of one without having to be a member of another.

The three clearing companies currently operating under the umbrella of APACS are responsible for the provision of the main interbank payment clearing mechanisms in the United Kingdom, and for coordinating developments in these systems. This involves running clearings for handling large-value automated transfers (CHAPS Sterling and CHAPS Euro), bulk electronic debits and credits (BACS), and cheques and paper credits (Cheque and Credit Clearing).

CHAPS Clearing Company Ltd is responsible for the large-value RTGS clearings. At present, CHAPS Sterling has 13 members and CHAPS Euro has 20 members. All members of both clearings are banks.

BACS Ltd (known as Bankers' Automated Clearing Services Ltd until 1986) offers an ACH service, providing electronic bulk clearing for direct debits, standing orders and other non-urgent, automated credit transfers. It currently has 14 members, including one building society.

The Cheque and Credit Clearing Company is responsible for the bulk paper clearing of cheques and credits in England, Wales and (since December 1996) Scotland. Paper clearing in Northern Ireland is not included in the APACS structure. It currently has 12 members, including one building society.

During 2001, APACS conducted a wide-ranging review of its governance arrangements. Following this, a number of changes have been implemented, with the result that the individual clearing companies now have an increased degree of autonomy. An aim of this move is to encourage competition in the payments industry.

The Bank of England is a member of APACS and of the individual clearing companies as of right, as well as by virtue of the banking business it conducts and its role in the settlement process. The Bank is thereby entitled to appoint a Director to the Boards of each of the clearing companies and to participate in all of APACS's policymaking committees. The legal powers the Bank enjoys from this representation are no greater than those of other members.

Any institution applying for membership of the major clearing systems must agree to pay an entry fee and a share of the relevant system's operating costs. It must meet the technical and operational requirements of the clearing, and the applicant must also obtain explicit agreement from the Bank of England to provide settlement account facilities for the purpose of settling obligations arising in these clearings.

APACS coordinates the discussion of issues of a non-competitive nature with regard to the payment card industry through the Card Payments Group. Membership of this Group, and of APACS, is open to any credit institution issuing more than 1 million credit, debit, ATM and cheque guarantee cards in the United Kingdom. There are currently 16 members of the Group. From an operational point of view, however, debit card schemes operate independently of APACS and there are also separate arrangements in respect of credit cards and ATM interoperability.

1.3.2 Financial Ombudsman Service (FOS)

The Financial Ombudsman Service provides consumers and small businesses with a free, independent service for resolving disputes with financial firms. Under the FSMA 2000, the FOS replaced all previously existing financial services ombudsman schemes. Complaints regarding the provision of money transmission services are included in the remit of the FOS, and its rulings are binding on all institutions regulated by the FSA. The FOS is also the "redress and complaints" authority for the United Kingdom in relation to the Cross-Border Credit Transfer Directive.

1.3.3 Codes of best practice

A committee to review banking services law (the Jack Committee) was established in 1987 by HM Treasury in association with the Bank of England. Its 1989 report, entitled *Banking Services: Law and Practice*, recommended that banks and building societies in the United Kingdom draw up a Code of Banking Practice, which would set out the standards of good banking practice to be observed in dealings with personal customers in the United Kingdom. It is updated periodically - the most recent edition took effect from 1 January 2001. The Banking Code is produced by the British Bankers' Association (BBA), the Building Societies' Association (BSA) and APACS.

The Code, the provisions of which have been accepted by the majority of banks and building societies providing retail services in the United Kingdom, is concerned with a wide range of banking activities and makes reference to certain payment systems services, including electronic funds transfers. Compliance by the subscribers to the Code is monitored by the Banking Code Standards Board (BCSB).

Since March 2002, the Banking Code has been complemented by the Business Banking Code, which sets out standards of good banking practice to be observed in dealings with business customers. It is produced by the BBA and APACS, and compliance is monitored by the BCSB.

Activities in the securities markets are similarly supported by a range of widely endorsed codes and legal documentation. Equity Repo and Gilt Repo Codes of Best Practice, drawn up under the aegis of the SLRC, set out standards of best practice for repo activity in UK equities and government stock. The SLRC Stock Borrowing and Lending Code of Guidance sets out the basic procedures which UK-based participants in stock lending/borrowing of both UK domestic and overseas securities should observe as a matter of best practice.

2. Payment media used by non-banks

2.1 Cash payments

Under the Bank Charter Act 1844, the Bank of England has the sole right to issue banknotes in England and Wales. The Bank currently prints and issues banknotes in four denominations - GBP 5, 10, 20 and 50 - and these banknotes circulate freely throughout the United Kingdom. Three banks in Scotland and four banks in Northern Ireland retain the right to issue their own sterling banknotes, but, apart from a very small fiduciary issue, these must be covered by holdings of Bank of England banknotes, or of approved coins.³ New banknotes are withdrawn by commercial banks from the Bank of England for distribution through their own cash centres.

The Royal Mint (a government agency) is responsible for the production and issue of coins throughout the United Kingdom. Coins are currently in general issue in eight denominations: 1 penny, 2, 5, 10, 20 and 50 pence, and GBP 1 and 2. A millennium commemorative GBP 5 crown was also issued in 1999. The Royal Mint meets demand by delivering coins to bank cash centres against payment by the banks.

Discussions between the wholesalers of cash (the commercial banks and the Post Office), the Bank of England and the Royal Mint are held under the auspices of the APACS Cash Services Group, the industry body for cash-related issues. The work of this Group covers all non-competitive issues concerning banknotes and coins.

At the end of January 2002, the value of banknotes in circulation totalled GBP 30.5 billion. APACS estimates that, in 2000, cash payments accounted for 74% of all transactions by volume (down from around 86% in 1984).

2.2 Non-cash payments

2.2.1 Credit transfers

The usage of paper-based credit transfers has tended to fall in recent years. The total volume of interbank paper credits cleared in the United Kingdom, for example, declined from 188 million items in 1990 to 161 million items in 2000, over which period the values processed fell from GBP 117 billion to GBP 86 billion. Paper-based credits, which are processed by the Cheque and Credit Clearing Company, are most often used for making consumer payments to large organisations (eg utilities and mail-order companies). They can also be used for payments to individuals, but this is increasingly rare.

CHAPS remains the main vehicle for transferring high-value automated credits that need to be settled on a same-day basis. A general rise in the number of transfers and values processed by this system has continued in recent years; average daily traffic through CHAPS Sterling rose from 31,000 items, valued at GBP 75 billion, in 1990 to 86,000 items, valued at GBP 195 billion, in 2000. On a peak day, CHAPS Sterling has processed over 200,000 payments and has handled daily values in excess of GBP 310 billion (the equivalent of over one third of annual UK GDP). In 2000, CHAPS Euro handled a daily average volume of around 13,000 domestic and cross-border payments, with a value of around EUR 160 billion. CHAPS Euro is currently the second largest cross-border component of the TARGET system by both volume and value.

The great majority of interbank electronic credits (including standing orders) are processed by BACS Ltd, although these are mainly small and medium-value items. Standing orders are used largely by individuals for the payment of regular fixed sums. After a period of decline during the early 1990s, as companies and other institutions encouraged customers to make greater use of direct debits, the total

³ This is subject to the provisions of the Bankers (Northern Ireland) Act 1845 and the Bank Notes (Scotland) Act 1845. Bank of England banknotes may be regarded as legal tender in England and Wales. Coins are legal tender throughout the United Kingdom, subject to certain limits as specified by the Currency Act 1983. Banknotes issued by banks in Scotland and Northern Ireland are not legal tender.

volume of such orders has been increasing over the past five years. The number of standing orders processed by BACS in 2000 was 247 million, up from 216 million in 1995.

There has also been an appreciable rise in the number (and value) of credits other than standing orders handled by BACS, which rose from 514 million items in 1990 to 1,060 million items in 2000. In the past, such credits tended to be used mainly for the disbursement of regular bulk payments such as salaries and wages. Increasingly, however, they are also being used for other transactions, such as one-off payments to business suppliers, and to make consumer payments initiated through telephone and PC banking.

BACS has also developed a separate credit transfer system for domestic euro transactions, which operates in a similar way to its sterling direct credit service. A number of members now offer the euro service to their corporate customers. However, the number of payments cleared through the BACS euro scheme remains very low. Annual volume in 2000 was around 6,300 items, with a total value of around EUR 390 million.

2.2.2 Cheques

As with paper-based credit transfers, the volume of payments cleared by means of cheques has fallen both in absolute and in relative terms since 1990. The number of interbank and interbranch items processed in the United Kingdom fell from 3,210 million in 1990 to 2,286 million in 2000. Cheques nevertheless still accounted for around 24% (by volume) of non-cash payments in 2000, and the values processed annually between 1990 and 2000 actually rose from GBP 1,329 billion to GBP 1,670 billion.

Payment by cheque to retailers is generally acceptable at the point of sale only if the drawer presents a cheque guarantee card issued by the institution on which the cheque is drawn. At the end of 2000, over 56 million cards with a domestic cheque guarantee function had been issued in the United Kingdom by 61 institutions cooperating within the Domestic Cheque Guarantee Card Scheme. The cards may have maximum guarantee limits of GBP 50, 100 or 250 (the amount is printed on the card), and individual institutions are free to choose which limit to offer to their customers. It is common for cheque guarantee cards to also function as a debit card and an ATM card.

The use of cheques at the point of sale has declined dramatically since the widespread introduction of debit cards, but they are still frequently used for the remote payment of utility bills and for business-to-business payments.

The Cheque and Credit Clearing Company has developed a euro bulk paper clearing to handle UK-issued cheques drawn in euros and presented in the UK cheque clearing. However, the number of payments cleared through the euro scheme remains very low, with annual volumes in 2000 of around 154,000 (for a total value of around EUR 1,500 million).

2.2.3 Direct debits

Direct debits allow recipients of large numbers of payments, such as insurance companies and service utilities, to collect these payments automatically from bank or building society accounts. The account holder must first provide a mandate - either written or over the phone/internet - to the originator in order to allow their bank or building society to pay debits for a variable amount. Interbank transfers originating from the direct debit process are cleared through BACS.

Under the rules of the Direct Debit Scheme, should any money be taken in error, then the customer's bank or building society must, on request, make an immediate refund to the customer's account - this is the Direct Debit Guarantee. The Guarantee covers situations where the originator has not given the required advance notice regarding a change of amount or date, and also protects customers should an incorrect amount be debited, or if a debit occurs earlier than the specified agreed date, or in error.

The use of direct debits grew rapidly in the late 1980s, with the increase in the number of direct debits processed amounting to around 20% per annum. The annual growth in volumes has slowed since 1990, but was still 7.9% in 2000. In that year, just over 2 billion direct debit items, worth GBP 485 billion, were processed by BACS, up from 846 million items with a total value of GBP 250 billion in 1990. In order to have greater control over their receipts and to reduce administrative costs, many companies have encouraged their customers (sometimes via financial inducements) to adopt direct debits.

2.2.4 Payment cards

There has been rapid growth in EFTPOS in the United Kingdom over recent years. At the end of 2000, there were around 735,000 EFTPOS terminals in the United Kingdom, up from 530,000 in 1997. These terminals accept credit cards, charge cards and debit cards.

Debit cards

Two debit card schemes were introduced in the late 1980s, and a large number of UK banks and building societies now provide their customers with debit card facilities. UK debit cards enable cardholders to make payments which are automatically debited from their current accounts, usually one or two days after the transaction has taken place.

The Switch scheme was launched in October 1988. By the end of 2000, the number of cards issued by UK banks and building societies under this scheme (Switch and Solo cards) had risen to 24.3 million, up from 11.4 million in 1990. Visa Delta was launched in February 1991, though UK-issued Visa debit cards had existed under different brand names since late 1987. A separate Electron brand was introduced in 1997. At the end of 2000, there were 25.4 million Visa debit cards in circulation, up from 7.5 million in 1990.

Both Switch and Visa debit cards can be used at EFTPOS terminals and remotely (via phone, mail or internet). Although these schemes allow cardholders to make payments overseas, they are primarily domestic schemes.

Visa Electron and Switch Solo cards are completely online debit cards. Both of these products operate in the same way as conventional UK debit cards, except that they require every transaction made to be authorised online, regardless of value. This allows them to be issued to customers who would not normally qualify for a debit card.

During 2000, UK-issued debit cards were used for over 2,300 million purchases in the United Kingdom, up from 192 million purchases in 1990. The number of debit card transactions now exceeds both credit card usage and the number of guaranteed cheques drawn at the point of sale. The average size of debit card domestic transactions (approximately GBP 33 in 2000) tends, however, to be lower than for those where payment is effected with credit or charge cards (approximately GBP 60 in 2000).

A number of retailers offer "cash back" facilities operated through the electronic point-of-sale systems in their stores. These facilities enable holders of debit cards to obtain cash as well as goods. It is estimated that there were 201 million cash back transactions in 2000.

Credit and charge cards

Credit cards issued by banks and building societies generally have a credit facility with a preset limit. Customers' credit card accounts are separate from their bank accounts, which may well be with another bank or building society, and cardholders receive a statement of the outstanding balance on their credit card account on a regular basis (usually monthly). Cardholders may either pay off the full amount of the balance, or they may choose to pay a portion (usually a minimum of 5%) of the total amount outstanding. Where the full balance is not settled each month, interest is generally charged on the outstanding balance from the date the transaction appears on the cardholder's statement, although the specific interest charging arrangements vary between credit card companies. From February 1990, a number of banks also started to charge their credit cardholding customers a flat rate annual fee, although this is often waived when a certain level of annual usage is achieved.

Until 1988, individual banks issued either Visa or MasterCard credit cards. In that year, four banks (Barclays, Lloyds, Midland and National Westminster) took up direct membership of both Visa and MasterCard, sometimes offering customers a choice of different terms for repayment. The credit card market is now very open, with a large number of new entrants in recent years. Of particular note is the number of specialist US credit card-issuing banks, which are now offering a range of different cards aimed at different payment behaviours. At the end of 2000, there were 37 UK issuers of Visa credit cards and 27 UK issuers of MasterCard credit cards.

By the end of 2000, there were 47.1 million credit cards and 3.8 million charge cards in issue in the United Kingdom. During that year there were 1,451 million credit and charge card purchases in the United Kingdom, valued at around GBP 87 billion. Over recent years, there has been a gradual decline in the number of charge cards as a proportion of the total market for credit and charge cards. Charge cards also tend to be used for more costly transactions than credit cards - in 2000, the

average transaction value per card was GBP 113, more than double the average transaction value of GBP 52 per credit card.

Retailer cards

Many retailers issue their own "in-store" cards. These typically only serve one store group and many operate on the basis of a revolving credit facility. This method of payment has not, however, proved to be popular with consumers. Indeed, in 2000, there was an estimated fall of 6 million - to 125 million - in the annual number of proprietary card payments made in the United Kingdom.

A recent trend is for retailers, particularly supermarkets, to offer banking services, either in their own right by obtaining a banking licence (for example, Marks & Spencer and J Sainsbury), or in conjunction with a commercial bank. An example of the latter is the Tesco supermarket group: in partnership with the Royal Bank of Scotland, Tesco now offers a Visa credit card, an instant access savings account, insurance products and an account which allows withdrawals at ATMs and debit card payments.

Electronic money

E-money activities in the United Kingdom are currently very small-scale. The two most significant pilot schemes, Mondex and Visa Cash, have now both closed, although a few campus-based trials remain. Nonetheless, other potential e-money providers (including several internet-based schemes) are preparing to enter the market in the United Kingdom.

At its peak, there were approximately 13,000 cardholders involved in the Mondex trial. Cards could be loaded from an ATM, with a special telephone, or by card-to-card transfer using an "electronic wallet". The majority of transactions were for less than GBP 20, and the average load amount was GBP 28. Approximately 60,000 cards were issued by the Visa Cash scheme, but the value stored on these cards could only be transferred to participating retailers - not to other cardholders.

Following consultations by HM Treasury and the FSA, the EC Directives on e-money have been incorporated into UK law. This move makes the issue of e-money in the United Kingdom a regulated activity under the FSMA 2000. There will, however, be a provision for small issuers to apply for a waiver from regulation by virtue of their small size or limited area of operation. The intention is to ensure an equitable application of the Directives for both bank and non-bank issuers of e-money.

Automated teller machines (ATMs)

At the end of 2000, around 34,000 ATMs were in service in the United Kingdom, double the number of machines at the end of 1991. Almost all of these are connected via the LINK interchange network, which allows customers of participating banks and building societies to access their accounts through the ATMs of any member institution. In 2000, there were over 2 billion ATM withdrawals, with a total value of around GBP 113 billion.

In addition to cash withdrawals, many ATMs enable their users to order new cheque books or statements and make balance enquires and deposits. More advanced ATMs allow customers to make bill payments, funds transfers, standing order enquiries, and to order mini account statements.

The majority of ATMs are located within banking halls or in the external fabric of banks' and building societies' branches. There is, however, a trend towards the remote siting of ATMs in locations such as motorway service areas, railway stations and supermarkets. Such sites now account for over a third of all ATM locations.

2.2.5 Postal instruments

Cashless payments can also be made through the Post Office. Postal orders can be used for small-value payments, and these are particularly convenient for those who do not have a bank account.

2.3 Recent developments

In February 2000, LINK, the United Kingdom's principal cash machine network, opened membership to non-financial institutions (without a sponsoring bank), prompting a number of independent ATM providers to join the network. Between them these firms had, by end-2000, set up over 5,000 new convenience cash machines. Each new member has to meet stringent technical and security criteria

before being permitted to join the network. The new machines are mainly sited in retail outlets. Any decision on charging is up to the ATM owner, but the vast majority of banks do not charge for the use of their machines.

APACS is currently managing a programme to improve the security of plastic cards in the United Kingdom. Card fraud, the majority of which arises from transactions made using counterfeit cards, has been increasing over recent years. Total fraud losses in 2000 reached nearly GBP 300 million, a rise of 55% on the 1999 figure. The UK banking industry is combating this problem by issuing cards with embedded microchips, commonly known as chip cards. It is intended that all UK debit, credit and charge cards will have been upgraded by the end of 2004.

Moreover, all credit and debit card transactions at the point of sale will, by 2005, be authorised by the customer keying in a PIN (personal identification number) rather than by signing a receipt. A public trial is planned for 2003. The combination of highly secure chip cards together with the use of PINs is expected to dramatically reduce the losses arising from card fraud.

3. Interbank exchange and settlement systems

3.1 General overview

In the United Kingdom, the main interbank payment networks are CHAPS (Sterling and Euro), BACS, and the cheque and credit clearings. Together these systems, all of which currently operate under the umbrella of APACS, process the vast majority of funds transfers between UK financial institutions.

The two CHAPS clearings are RTGS systems primarily designed for high-value payments, although there is no lower (or upper) limit on the value of payments that may pass through the clearings. Three other major interbank payment systems (BACS and the cheque and credit clearings) deal with high volumes of relatively small-value payments, although they are able to accommodate non-urgent large-value transfers if required.

All three "retail" clearings work on a three-day processing cycle and are not suited for use by those wholesale financial markets (eg foreign exchange and money markets) which are geared to shorter settlement cycles. As a result, the average value of transactions in these clearings is much smaller than for those processed through either of the CHAPS clearings. The average value of individual payments passing through the UK clearings in 2000 ranged from GBP 580 in BACS to around GBP 2.3 million in CHAPS Sterling.

In order to facilitate the operational side of making payments, a nationwide system of unique codes is employed to identify clearing members and, at each clearing member's discretion, their branches and major customers. These sort codes are printed, together with a code identifying the customer's account, on such instruments as cheques and giro credits in machine-readable form.

3.2 CHAPS

CHAPS started operating in 1984 as a nationwide, electronic interbank system for sending irrevocable, guaranteed and unconditional sterling credit transfers. Final settlement took place on an end-of-day multilateral net basis. In April 1996, CHAPS was developed into an RTGS system and now handles nearly all large-value same-day sterling payments between banks. The average daily value of payments passing through the CHAPS Sterling system was GBP 195 billion in 2000 and, on a peak day, the system has processed transfers with a total value of GBP 318 billion. There are currently 13 direct participants in CHAPS Sterling.

In January 1999, a second CHAPS system - for euro-denominated payments - was launched. CHAPS Euro connects to the TARGET system, which links together the RTGS systems of the 15 EU states and the European Central Bank. This provides member banks with the ability to make and receive cross-border as well as domestic payments in euros. A total of 20 banks, including two remote participants, are members of CHAPS Euro. Of these, 12 banks (including the Bank of England) are also members of CHAPS Sterling.

With the introduction of an enhanced RTGS service called NewCHAPS in August 2001, CHAPS Sterling and CHAPS Euro now operate on a common technical platform. The new platform, which is based on the SWIFT FIN Copy Financial Application service, enables member banks to manage their outgoing payments using a central scheduler and also to obtain real-time payment flow information via the "Enquiry Link" facility.

3.2.1 Operating rules

The CHAPS Clearing Company Ltd sets the operational rules for the CHAPS clearings and is responsible for the development of the network. The settlement members of CHAPS are involved in setting these rules through their membership of the Company's Board and its subcommittees.

3.2.2 Participants in the system

The direct members of the CHAPS clearings are the institutions responsible for settling all transfers, and consequently all interbank obligations arising through this system. Other financial institutions are able to make and receive payments through CHAPS by virtue of agency agreements with settlement members. Individual bank customers can also route urgent payments (property purchase transactions, for example) via CHAPS. These transfers are described as customer payments and use a different SWIFT message format from transfers arising from banks' own activities (interbank payments).

3.2.3 Types of transaction handled

There is no restriction on the type (or value) of transaction handled provided it is an unconditional payment denominated in either sterling or euros. A significant proportion of CHAPS payments, by value, originate in the foreign exchange market and other wholesale markets owing to their requirement for a prompt settlement service. The CHAPS system is, however, also used to facilitate same-day transfers arising from a range of other activities (eg general commercial transactions and the purchase of domestic property), and the value of individual transfers can be quite small.

3.2.4 Operation of the system and settlement procedures

Both CHAPS systems currently open at 6 am. The standard closing times for CHAPS Sterling and CHAPS Euro are 4.20 pm and 5 pm respectively,⁴ although for both systems the deadline for submitting customer payments is 4 pm. Most settlement members will, however, negotiate cutoff points with their customers, so that any payment requests received after a set deadline will be handled on a "best efforts" basis. From 4.20 pm until 5 pm, the CHAPS Sterling settlement banks are able to use the Enquiry Link facility to make (interbank) transfers under the Late Transfer Scheme.⁵

Each CHAPS payment is settled at the Bank of England before details are sent to the receiving bank. When a payment message is submitted to the SWIFT network, it is held in the FIN Copy service while a settlement request (a subset of the information contained in the main message) is sent to the Bank of England. Only if the sending bank has sufficient funds on its account does the Bank of England settle the transaction by debiting the account and crediting the receiving bank. The Bank then returns a confirmation message to the FIN Copy service. As soon as this confirmation is received, the main message containing the full payment details is released automatically to the receiving bank, which has the assurance that it has received final and irrevocable funds on its account at the Bank of England.

According to CHAPS Clearing Company rules, members should only forward settlement requests to the Bank of England when they have sufficient funds on their settlement account to allow the transaction to be processed immediately. The settlement banks must therefore manage their outgoing payment stream, and this can be done using either the NewCHAPS central scheduler or their own internal systems. In order to facilitate efficient queue management, each member is able to obtain

⁴ The different closing times arise from the requirement that CHAPS Euro observe the TARGET timetable.

⁵ The Bank of England must sanction all transfers made under this scheme. The receiving bank must also confirm that it is prepared to accept the funds.

details of its account balance, a summary of its CHAPS payments settled and a listing of various non-CHAPS items it has paid or received by making use of Enquiry Link.

There are no provisions in the CHAPS rules for revocability, but where a payment has been made in error, the receiving settlement member is required to send an offsetting transfer back to the original sender by no later than 12 noon the next day. The central systems at the Bank of England include a facility to allow settlement requests which have been mistakenly forwarded to the RTGS system (but which have not yet been settled) to be cancelled at the request of the sending bank.

As a form of contingency, the NewCHAPS platform provides (for both CHAPS clearings) functionality known as circles processing. This allows queued payments held at two or more banks to be forwarded to the central RTGS accounting system at the Bank of England and settled simultaneously, although still in gross form. This is a useful mechanism to address situations where there may be insufficient liquidity to allow each payment in a given set to settle sequentially, but where the available funds would permit these to be settled collectively. While this facility assists in preventing blockages (gridlock) from arising, it is not used routinely during the course of each day, given that the CHAPS banks have access to additional intraday liquidity to ensure that all payments can be made (see Section 3.2.5 below).

In order to guard against the failure of the central RTGS platform, the Bank of England's real-time accounting system is duplicated at a remote standby site. All entries to accounts held at the main site are copied to this second location and the standby site is able to take over the functions of the main site if its ability to operate is impaired. As a final resort, the CHAPS clearings both have the ability to operate as net end-of-day systems in the unlikely event that both the primary and secondary sites are rendered inoperable.

Each settlement member has its own contingency arrangements to address the possibility of an internal systems failure during the day. These may take a variety of forms and are the responsibility of the individual member.

3.2.5 Provision of credit facilities

At the end of each business day, the CHAPS members are expected to have credit balances on their settlement accounts (both sterling and euro). A penalty is applied where banks incur an overnight overdraft. The provision of intraday liquidity to settlement banks, however, is regarded as necessary for the efficient operation of the CHAPS system, as the funds held by the clearing banks on their settlement accounts overnight typically represent only a very small proportion of the total values passing through CHAPS and the other clearings each day.

Banks in the United Kingdom are not subject to reserve requirements for monetary policy purposes. They are, however, obliged to hold cash ratio deposits (CRDs) with the Bank of England. CRDs are non-interest bearing deposits which are calculated as a percentage of each bank's eligible liabilities (currently 0.15% of all liabilities in excess of GBP 400 million). Prior to the introduction of RTGS, these sums were not available for use in the settlement process, but, in order to provide additional liquidity, the CHAPS Sterling banks are now allowed to make payments against these deposits during the day. They are required to reinstate them by the time the RTGS system closes.

An additional intraday credit facility is provided by the Bank of England through the sale and repurchase (repo) of eligible assets.⁶ CHAPS Sterling members are able to repo an unlimited amount of eligible assets to the Bank at any time during the business day, but all repos must be reversed by the end of the day. For the CHAPS Euro members, there is a constraint on the total amount of intraday liquidity available from the Bank of England. The arrangements under which the Bank, as a non-euro area national central bank, is able to provide intraday credit in euros are laid down by the Governing Council of the ECB. At present, the maximum amount of credit permitted in aggregate across all participants is EUR 3 billion, and the maximum for an individual participant is EUR 1 billion.

⁶ A list of the assets eligible for intraday repo is maintained on the Bank of England's website, <http://www.bankofengland.co.uk>.

3.2.6 Pricing policies

Settlement members of either of the CHAPS systems have to pay an entry fee to the CHAPS Clearing Company upon joining the system, and also an annual charge to CHAPS to cover their share of the system's operating costs. Members do not have to pay any per-item fees to the CHAPS Clearing Company for the use of the CHAPS system.

The Bank of England charges a per-item tariff in respect of each CHAPS Sterling transfer settled using the RTGS processor, plus an annual fee for each settlement account, in order to cover the costs of running its real-time accounting system. The costs of the Enquiry Link facility are recovered by an annual charge levied on each terminal connection. Similar principles are applied to domestic CHAPS Euro payments, but cross-border TARGET payments (including those initiated via CHAPS Euro) between participants throughout the system are subject to a separate pricing framework as laid down by the Governing Council of the ECB, under which there is a digressive per-item charging regime.

The fee a settlement member charges its customers for a CHAPS transfer (sterling or euro) is a matter for commercial negotiation between the parties concerned. These charges may be on a per-item basis or as part of a package negotiated by the bank with its customer.

3.2.7 Future developments

The introduction of Continuous Linked Settlement (CLS) in the foreign exchange market is likely to have a significant impact on both the CHAPS clearings. The newly created CLS Bank commenced operations in September 2002, and APACS estimates that this could ultimately reduce volumes in CHAPS Sterling and CHAPS Euro by 10% and 50% respectively.

Moreover, the liquidity requirements of several CHAPS members have changed as a result of CLS. CLS settlement members are now required to meet a number of pay-in (to CLS Bank) deadlines during the morning, and must therefore have sufficient funds available at the required time. The full impact of this will only become apparent once CLS has been operating for a number of months.

3.3 BACS

BACS is an ACH responsible for clearing bulk electronic transfers in both debit and credit form, and now processes the great majority of electronic interbank funds transfers in the United Kingdom. The clearing is operated by BACS Ltd. The service (which began operating in 1968 as the Interbank Computer Bureau) was established to provide a more efficient method of handling interbank transfers by means of magnetic tape rather than paper instruments, although BACS transfers are now exclusively input through telecommunications links.

3.3.1 Operating rules

BACS Ltd sets operational rules for users and for the banks and building societies which act as settlement members of BACS. Settlement members are involved in setting these rules through their membership of the company's Board and its subcommittees. BACS currently operates under the umbrella of APACS.

3.3.2 Participation in the system

The membership of BACS consists of the Bank of England, 12 commercial banks (representing 10 separate banking groups) and one building society. These credit institutions are the shareholders of BACS Ltd, and are responsible for settling all interbank obligations arising from the BACS clearing process. Settlement members must meet the membership criteria set out by BACS Ltd.

Members of BACS are also able to sponsor other organisations as users of the service. Users are allocated a BACS user number by their sponsor and are able to submit payment instructions directly to the system. There are in the region of 60,000 users, including a wide range of commercial and public sector bodies, along with many other indirect users who submit instructions via an intermediary.

3.3.3 Types of transaction handled

BACS clears sterling-denominated standing orders, direct debits and direct credits. It has also recently introduced a separate credit transfer system for domestic euro transactions (see Section 2.2.1 above). There is no restriction on the value of individual payment instructions submitted to BACS, although in practice the vast majority of transfers processed are of low value.

3.3.4 Operation of the system and settlement procedures

Users submit payment data to the BACS clearing house through BACSTEL, a telecommunications service which offers direct connection to the BACS computer centre. Some of the major users of the system use direct high-speed links. BACS sets common standards for the format in which payment information is supplied, and users may submit payment instructions between two and 71 days ahead of the date for payment.

Payments submitted to BACS are subject to a three-day clearing and settlement cycle. The deadline for receipt of payment information from users is 10.30 pm (UK time) on Day 1 of the cycle. These data are then sorted into bank order at BACS and transmitted onward to destination credit institutions. A destination bank may be either a receiving bank or a paying bank depending on whether the transaction under consideration is a credit or a debit. This process should be completed by 6 am the following day (ie Day 2). The paying bank receives a report confirming each submission on Day 2. On Day 3, transfers are debited/credited to respective payer/payee accounts, usually at the beginning of the operating day.

The interbank obligations that arise in BACS are settled at the Bank of England on a multilateral net basis on Day 3 of the clearing cycle. This occurs at 9.30 am each day by posting the multilateral net amounts directly to the members' settlement accounts using the RTGS processor.

Each settlement member is responsible for settling the payments generated by the users it sponsors. There is no system of limits or other controls within BACS itself to inhibit the numbers or value of payments for which a particular settlement member is responsible. The extent to which a user can initiate BACS transfers and its arrangements for funding the resultant outflow are a matter to be decided bilaterally with its settlement bank.

3.3.5 Pricing

BACS Ltd applies tariffs to the sponsoring banks of users in respect of both incoming and outgoing payment messages. The sponsoring banks negotiate independently with users and other customers the charges which they will incur as a result of generating BACS transfers or receiving credits through this medium.

3.3.6 Future developments

BACS has announced a major technology renewal programme to meet the rapidly growing demand for electronic payments and to integrate the latest security methods. This programme is known as "NewBACS" and is scheduled for completion by 2005.

3.4 Cheque and credit clearings

The Cheque and Credit Clearing Company, which currently operates under the umbrella of APACS, is responsible for the cheque and paper credit clearings for England, Wales and (since December 1996) Scotland. A separate clearing operates in Northern Ireland under local paper clearing arrangements, and this falls outside the APACS structure.

3.4.1 Operating rules

Although the cheque and credit clearings are managed by the same body and have the same set of settlement members,⁷ they are distinct clearings subject to their own rules. The rules of each are set out by the Cheque and Credit Clearing Company.

3.4.2 Participation in the system

The Cheque and Credit Clearing Company has 12 direct settlement members, which settle all interbank items passing across the two clearing arrangements. The membership includes the Bank of England, 10 commercial banks (representing nine separate banking groups) and one building society. Settlement members must meet the membership criteria laid down by the Company. Other banks and building societies can have access to both clearings through agency arrangements with the direct members.

3.4.3 Types of transaction handled

The cheque clearing and the credit clearing systems handle paper debit items (ie cheques) and credit items (ie bank giro transfers) respectively. Cheques processed through the cheque clearing and paper credits passed through the credit clearing must meet the physical specifications (relating to layout and paper specifications) laid out in the rules of the relevant clearing. There are, however, no restrictions on the value of individual transfers or on the economic nature of the original transaction.

3.4.4 Operation of the system and settlement procedures

The cheque and credit clearings both operate on a three-day payment and settlement cycle, although an additional day is sometimes necessary for items requiring cross-border clearing between England and Scotland.

Clearing

A cheque presented to a branch of a member bank during banking hours will usually be processed by the collecting bank that day. This may involve the magnetic encoding of the value of the cheque in the pre-existing codeline at the bottom of the cheque, but members are moving towards the adoption of new technologies, such as imaging reading, that will circumvent the need for this.

Early the following day, cheques are sent to the collecting bank's clearing centre. Here the cheques are automatically "read" by machines, which evaluate the codeline and sort the cheques by drawing bank. The codeline data are then transmitted over the Interbank Data Exchange (IBDE) network, which is currently operated by BACS. These data are primarily used as a check on the paper delivery, but also allow the paying bank to begin updating customer accounts before the paper items arrive.

Having been sorted, the cheques are sent by the collecting bank to the Clearing Exchange Centres (one in London and one in Scotland), where they are passed to the paying bank. The Clearing Exchange Centres are open between 6.30 and 11 am each day. Received cheques are then processed by the paying bank's clearing centre to verify the value of settlement between itself and other settlement members and to sort the cheques between its own branches.

The cheques are then packaged ready for delivery to the individual branches on which they are drawn, although a change in the law in 1996 removed the requirement for cheques to be presented physically.⁸ Electronic data are now a legally acceptable form of presentation, and many banks are now retaining cheques at their head office or clearing centre. This is known as paying bank truncation.

Whether in physical or electronic form, the cheques will arrive at the relevant branch by the third day of the clearing cycle. Branch staff then review them to see whether the instruments in question should be

⁷ Members of the Company operate as settlement members of both cheque clearing and credit clearing; they do not have the option of being a member of only one of these two payment systems.

⁸ The relevant legislation is the Deregulation (Bills of Exchange) Order 1996.

accepted or returned. The point at which the collecting bank credits funds to the payee's account and allows the payee to draw against these is a commercial decision and varies between banks.

Paper credits, for which the collecting bank is generally the payer's bank, follow a reverse process to cheques. The processing procedures for the credit clearing are very similar to those employed in the cheque clearing, but the codeline data, despite the pre-printed details being more comprehensive than on cheques, are not transmitted over the IBDE network. Moreover, settlement figures for the credit clearing are ascertained by receiving banks once they have read the codeline data.

Settlement

The interbank settlement of items processed through the cheque and credit clearings occurs on the third day of the cycle. In respect of each clearing, multilateral net obligations for each member are transmitted to the Bank of England no later than 10.30 am. Settlement is then effected at 11 am through postings of the net amounts to the members' settlement accounts using the RTGS processor.

There is no system of limits to control the interbank settlement obligations that arise in the cheque and credit clearings. In contrast to CHAPS, the settlement members of these clearings are considered to be acting as agents of their customers rather than as principals. The value of interbank settlement obligations is also typically much smaller.

3.4.5 Pricing

The Cheque and Credit Clearing Company does not impose a per-item charge on cheques or credits handled; its costs are met through direct contributions by shareholders (the settlement members). Banks negotiate charges with their business customers for processing debits and credits arising from paper instruments, but most banks do not impose such direct fees on their personal customers.

3.4.6 Future developments

As mentioned in Section 3.4.4 above, some participants in the cheque clearing have introduced paying bank truncation, whereby the paper instruments are retained at the head office of the paying bank. A major project in the future will be the introduction of collecting bank truncation, although because of the need to examine endorsements and signatures on cheques this is unlikely to occur until cost-effective and sufficiently rapid imaging technology is available.

3.5 Currency clearings

Until recently, a number of currency clearings also operated under the APACS umbrella, catering for paper-based payment orders denominated in major currencies other than sterling and euros, including US dollars, Canadian dollars, Australian dollars, Japanese yen and Swiss francs. In June this year, however, falling volumes prompted the closure of all except the US dollar currency clearing. Reflecting this decision, of the 413,000 items worth GBP 4.8 billion processed by the currency clearings in 2000, the US dollar clearing accounted for 38% by volume and 74% by value.

4. Trading, clearing and settlement

4.1 General overview and recent developments

UK markets

The United Kingdom has major securities markets in UK government stocks, domestic and international equities, debt securities (including eurobonds) and money market instruments. There is also a highly developed market in derivatives based on these and other instruments. The most active participants in these markets are domestic and international banks and securities houses, as well as institutional investors such as pension funds and insurance companies.

Equities, debentures, loan stocks and other securities listed in the United Kingdom are mainly traded through the London Stock Exchange, but some volumes also go through virt-x. Both exchanges also offer trading facilities in a range of overseas securities. UK government stock is mostly traded through gilt-edged market-makers, subject to the rules of the London Stock Exchange. Eurobonds and short-term eurocurrency paper are generally listed in the United Kingdom or on the Luxembourg Stock Exchange, but are traded OTC under the rules of the International Securities Market Association (ISMA). A significant proportion of all eurobond trading takes place in London.

There is also a very large volume of OTC derivatives activity in London and standardised derivatives contracts are traded on LIFFE, the LME, the IPE and the OM London Exchange (OMLX). LIFFE's contracts comprise futures and options on UK and foreign government bonds, short-term interest rates, equity indices and individual equities. The LME and IPE offer contracts on metals and energy products respectively. In addition to providing Swedish equity derivative contracts on an automated trading system linked to that of its parent, the OMLX also operates Jiway and the UK Power Exchange.

Sterling- and euro-denominated money market instruments are traded OTC.

Trading

UK exchanges, clearing houses and settlement systems have undergone significant change in recent years, and this process continues at a rapid pace. Like many of their European counterparts, the United Kingdom's exchanges have responded in a variety of ways to the opportunities offered and challenges posed by the integration of (particularly European) capital markets, technological advances, member consolidation and increases in global cross-border trade.

Both the London Stock Exchange and LIFFE have introduced electronic trading systems. Around 200 securities are traded on the London Stock Exchange's SETS electronic order book, although a significant proportion of trading in these securities continues to take place over the telephone or via automated systems provided by the major market liquidity providers (in particular the so-called retail service providers). Trading in most of the remainder of London Stock Exchange securities is facilitated by a screen-based quotation system called SEAQ (Stock Exchange Automated Quotation), which displays two-way prices from competing market-makers. For less liquid and AIM (Alternative Investment Market) securities, a hybrid market of quotes and orders is used. The London Stock Exchange also supports the SEATS PLUS trading system, a hybrid quote-driven/order-matching system which is used for less liquid securities in addition to securities listed on AIM. virt-x and the OMLX continue to offer electronic order books. The vast majority of LIFFE contracts are now traded on LIFFEConnect. Furthermore, both the IPE and the LME are assessing their members' needs in this respect and plan the limited introduction or expansion of existing screen trading facilities (eg LME Select).

The London Stock Exchange, LIFFE, the IPE and the LME have all demutualised to become for-profit, shareholder-owned institutions. Demutualisation is enabling these exchanges to respond more efficiently to commercial pressures in an increasingly competitive environment. virt-x plc is part-owned by the SWX Swiss Exchange and the TP Consortium (a group of major European securities firms); its shares are traded on the London Stock Exchange's AIM. The OMLX is a part of the OM Group, which is listed on the Swedish Stock Exchange. The London Stock Exchange's shares are listed on its own exchange. Subsequent to their demutualisations, LIFFE has been purchased by Euronext and the IPE by the Intercontinental Exchange (a US-based commodity trading platform run by a consortium of banks, oil and energy firms).

The opportunities offered by these developments have encouraged a number of new and prospective entrants into the UK equity markets. Thus, Jiway offers execution facilities to brokers and other financial intermediaries for transactions below a certain size limit, based on a central order book supported by firm quotes provided by market-makers. Agency brokers such as Instinet and Posit provide matching facilities to institutional investors and brokers. E*Crossnet provides a crossing service to institutional investors. Market-makers and institutional brokers continue to expand the range of crossing and order-routing facilities available to customers.

Similar trends are being seen in the fixed interest markets. Recent years have seen the introduction of a range of electronic inter-dealer and dealer-customer execution and quotation systems. Coredeal MTS (an RIE) and authorised financial intermediaries such as BrokerTec, EuroMTS and Cantor/E*Speed provide inter-dealer execution in a wide range of eurobond and European government bond cash trades and repos. For the time being, UK government bond trading remains

largely telephone-based, with market-makers' quotes being distributed over a variety of quote vendor systems. The UK Debt Management Office is, however, planning to introduce an electronic inter-dealer system with mandatory quote obligations.

Clearing

LCH remains the United Kingdom's principal CCP clearing house, although the OMLX and Jiway also operate in-house clearing facilities. In September 2001, the EuroCCP gained RCH status and has been chosen as the CCP for Nasdaq Europe.

LCH continues to provide CCP services for LIFFE, the LME and the IPE, along with the clearing of cash and repo trades in European government and supranational bonds ("Repoclear", which was expanded to include UK government bonds in August 2002) and plain vanilla interest rate swaps ("Swapclear"). Since 26 February 2001, LCH has acted as CCP for trades on the London Stock Exchange's SETS electronic trading system, in cooperation with CRESTCo; and on 18 March 2002 it began to act as CCP for a limited number of contracts traded on the Intercontinental Exchange. LCH and virt-x have been in discussion with the aim of implementing a CCP for the exchange in March 2003.

Settlement

Settlement is also undergoing a process of consolidation, both domestically and internationally. Again, this process reflects the considerable operational savings and efficiencies and the potential reductions in risk available from rationalisation.

CRESTCo owns and operates the United Kingdom's two settlement systems, CREST and the CMO. Opened in 1996, CREST initially settled UK and Irish equities and corporate bonds. In July 2000, UK government debt was integrated into the system and the CGO was closed. Money market instruments continue to settle in the CMO, but work is under way to integrate them into CREST (by end-2003).

CRESTCo has, in addition, established direct links to CSDs in Switzerland (SIS SegalInterSettle) and the United States (DTCC) and to Euroclear, enabling CREST members to hold securities which settle in those systems. CSDs from the following countries have also established links to CREST: Sweden (VPC); the Netherlands (Necigef); and Australia (CHESS).

Most recently (September 2002), the merger between CRESTCo and Euroclear has taken place. CRESTCo has become a wholly owned subsidiary of Euroclear Bank, but will continue to operate as CRESTCo at least until the launch of the new group's "single settlement engine", planned for 2005.

4.2 Trading

4.2.1 London Stock Exchange

Ownership and governance

In July 2001, the London Stock Exchange listed on its own market and became a fully commercial public limited company. This followed the demutualisation of the company in March 2000. Shares in "London Stock Exchange plc" are now listed and freely traded in the same way as other UK equities.

Regulatory status

The London Stock Exchange is an RIE under the FSMA 2000. Responsibility for the UK Listing Authority, which regulates the United Kingdom's primary market for issuing companies, was transferred to the Financial Services Authority in May 2000.

Participation

The London Stock Exchange has approximately 300 member firms. In order to trade on the Exchange, a firm must become an authorised member firm or a SETS participant.

An applicant for membership must be:

- authorised under the FSMA 2000;

- an exempted person under the FSMA 2000;
- a person whose activities constitute “excluded activities” under the FSMA 2000, whether such activities are carried out in the United Kingdom or elsewhere in the European Union;
- an “overseas person” as defined by the FSMA 2000; or
- a “European institution” as defined by the Banking Co-ordination (Second Council Directive) Regulations 1992 and the Investment Services Regulations 1995.

The London Stock Exchange will also assess the applicant’s suitability for membership by considering the scope of the applicant’s business activities, internal procedures and controls, etc.

Membership is divided into clearing and non-clearing members. Clearing members must satisfy the membership criteria of LCH (see below).

Transactions handled

The following classes of security are admitted to trading on the London Stock Exchange:

- UK equities;
- international equities;
- shares and fixed interest stocks of companies admitted to AIM, which was set up in 1995 for young and fast-growing businesses;
- securities on techMARK, for innovative technology companies;
- securities issued by the UK government (gilts);
- sterling bonds issued by companies or local authorities;
- eurobonds and euro-convertible bonds and medium-term notes issued by UK and international companies;
- depositary receipts; and
- exchange-traded funds.

In 2001, over 595 billion UK equity shares were traded on the London Stock Exchange, representing a turnover value of approximately GBP 1,905 billion. In the same period, approximately 1,208 billion trades in international equity shares were reported to the Exchange, with a corresponding turnover value of GBP 3,676 billion.

System operating procedures

Around 215 stocks are traded on SETS, the Exchange’s electronic order book. The order book includes the FTSE 100, the more liquid FTSE 250 securities, exchange traded funds, selected Irish stocks and other securities suited to order book trading. Anonymous limit orders match continuously throughout the trading day on the basis of price/time priority. Unmatched limit orders and market orders are submitted for auction at the start and end of each SETS trading day, with orders executed at the clearing price which is set to enable the maximum volume of shares to be traded.

Non-SETS securities are traded on a quote-driven market, supported by a number of market display mechanisms. The majority of non-SETS UK equities are quoted on the SEAQ system. The Stock Exchange Alternative Trading Service (SEATS PLUS) is a hybrid market-maker/order book service which supports the least liquid securities. Liquid depositary receipts and blue-chip international securities are traded electronically on the International Order Book and International Retail Service respectively. Other international stocks and less liquid depositary receipts are quoted on SEAQ International (SEAQI).

SEAQ and SEAQI are both quote-display systems used as the reference point for telephone execution between market participants and competing registered market-makers (who are required to quote bid/offer prices). For FTSE 250 stocks, the SEAQ quote-driven market is supplemented by three intraday SEAQ crosses.

Clearing/settlement

In February 2001, the London Stock Exchange, CRESTCo and LCH introduced a central counterparty service (CCP) on a gross basis for trades executed on SETS. With LCH acting as CCP, market participants have full post-trade anonymity and improved management of counterparty risk. The service was expanded in July 2002 with the implementation of settlement netting.

Trades in UK equities and corporate bonds settle through CREST. The standard settlement cycle is three days. Participants may, however, agree to use a different cycle for individual trades ranging from same-day to 25-day settlement. Trades in overseas equities settle through the relevant domestic or international CSD in accordance with local market deadlines.

Operating hours

Trades can be reported to the Exchange from 7.15 am to 5.15 pm London time. Trades executed outside these hours are reported when the system next opens.

The SETS Order Book continuous execution period and SEAQ Mandatory Quote period extend from 8 am to 4.30 pm London time. The SETS opening auction call period runs from 7.50 to 8 am and the closing auction call period from 4.30 to 4.35 pm (with a random end in each case to discourage market manipulation). Auction call periods are automatically extended in the instance of unfilled market orders or price movements greater than defined parameters.

The International Order Book has an opening auction call period from 8.30 to 9 am, and this is immediately followed by a continuous trading period that ends at the start of the closing auction at 3.30 pm. The closing auction call period lasts for 10 minutes subject to a random end and any price or market order extensions.

The International Retail Service mandatory committed principal period is based on that of the home market, subject to a London opening time no earlier than 8 am and end time no later than 5 pm.

SEAQ International quotations may be input between 7.30 am and 5.15 pm London time.

4.2.2 virt-x*Ownership and governance*

virt-x Exchange Ltd is a wholly owned subsidiary of virt-x plc, in which the SWX Swiss Exchange and the TP Consortium each have a 38.9% shareholding. virt-x uses the SWX system and network, including the SWX trading platform, under a facilities management agreement.

Regulatory status

virt-x is an RIE under the FSMA 2000 and is also designated as a “regulated market” under the ISD. virt-x does not have listing authority in the United Kingdom and the procedure for listing of Swiss blue-chip equities is under the authority of SWX.

Participation

virt-x can be accessed by regulated financial institutions from the EEA, Switzerland, Hong Kong and the United States. It currently has 107 approved members, of which 102 are live trading members.

Transactions handled

virt-x provides trading in pan-European blue chips of the major European indices, eg the FTSE 100 and the STOXX 50.

System operating procedures

Using the SWX Swiss Exchange trading platform, virt-x provides a continuous public limit order book with full anonymity prior to execution. Users can access the system either directly through the installation of a virt-x gateway and circuits on the member's premises, through a sponsoring direct member of virt-x (ie as a sponsored user), or through an independent software vendor (ISV) that has access to the virt-x trading system.

Clearing/settlement

All order book trades settle on a T+3 basis, and can be settled in CREST, SIS or Euroclear. Currently, settlement is between trading counterparties; it is envisaged that CCP clearing through LCH and x-clear will be introduced in March 2003.

Operating hours

virt-x trading hours are from 8 am to 4.30 pm London time.

4.2.3 Coredeal MTS

Ownership and governance

In November 2001, Coredeal entered into a partnership with EuroMTS (the leading pan-European trading platform for government benchmark securities). Coredeal MTS, which began trading on 1 February 2002, is owned by EuroMTS, the International Securities Market Association (ISMA) and 11 major banks and securities houses.

Regulatory status

Coredeal MTS is an RIE under the FSMA 2000. The exchange has also been designated as a regulated market by the FSA for the purposes of the ISD.

Participation

Coredeal MTS admits members on the basis of them contracting to abide by the exchange's rules and guidance. There are two classes of member: clearing and non-clearing. Clearing members are also required to be a member of the central counterparty TradeGo. Non-clearing members are not required to be a member of TradeGo but must instead make arrangements with a clearing member to clear transactions on their behalf. As an RIE, Coredeal MTS monitors members' compliance with its rules and there is a clear disciplinary process should rule breaches occur. Access to the trading system for all members is strictly controlled and monitored.

Transactions handled

Coredeal MTS is an electronic exchange for benchmark corporate bond issues.

System operating procedures

Coredeal MTS operates on the Telematico platform that is used by all the MTS exchanges. It has become a quote-driven market with established market-maker obligations.

Clearing/settlement

All trades are executed on Coredeal MTS anonymously, after which settlement instructions are automatically generated from the Telematico system and sent to TradeGo (via Euroclear). Trades for non-clearing members are cleared in the name of the clearing member with whom the necessary arrangements have been made.

Outright cash trades on Telematico settle according to the prevailing market rule for the relevant instrument traded. Most eurobonds settle on a T+3 cycle in Euroclear.

Operating hours

Coredeal MTS operates from 7.15 am to 4.30 pm London time.

4.2.4 Jiway

Ownership and governance

The Jiway market is operated as a market of the OM London Exchange (OMLX), which is itself wholly owned by OM AB.

Regulatory status

The Jiway market started trading in November 2000. It now operates within the regulatory framework of the OMLX, which acquired RIE status from the FSA in 1999.

Participation

Jiway admits as trading parties regulated European brokers and other financial intermediaries.

Transactions handled

Jiway is designed to provide its members with transparent and convenient access to markets for which direct membership is commercially impracticable. It currently provides a single access point for trading, clearing, settlement and safekeeping for equities in eight exchanges in seven countries (as at September 2002) across Europe and the United States.

System operating procedures

Jiway ensures that execution of orders (currently up to a limit of EUR 50,000, as at September 2002) occurs with at least as good a price and volume as the best available on the appropriate local market. Jiway provides trading, clearing, settlement and safekeeping using OM's technology operations.

Clearing/settlement

All trades are executed against Jiway itself, which operates as the CCP.

Jiway provides a single access point for settlement of transactions across all of its markets. Trading parties can elect to use Jiway for safekeeping or to designate external settlement systems on a per-account basis.

Operating hours

Jiway gives access to trading each stock whilst that stock is open for trading on the underlying local exchange. The Jiway support desk is open during European and US trading hours.

4.3 Clearing**4.3.1 London Clearing House**

LCH acts as CCP to trades executed on LIFFE, the LME, the IPE and the London Stock Exchange (trades on the SETS electronic trading platform) and a limited number of contracts on the US-based Intercontinental Exchange.

Since 1999, LCH has acted as CCP for cash and repo trades in European (Austrian, Belgian, Dutch, German and UK currently, with more planned) government bonds, supranational and agency bonds and Jumbo Pfandbriefe ("Repoclear") and plain vanilla interest rate swaps ("Swapclear").

Ownership and governance

LCH is a public limited company. It is owned by its members (75% of the share capital) and LIFFE, the LME and the IPE (25% of the share capital in total).

Regulatory status

LCH is an RCH subject to supervision by the FSA under the FSMA 2000.

Financial resources

LCH assumes counterparty default risk when it accepts trades into clearing and covers that risk by requiring payment of margin. Initial margin (collateral), which is collected on all trades, is intended to protect LCH against the potential loss of a defaulter's positions before closeout. LCH also collects variation margin to re-establish this protection at close of business and, if necessary in fast-moving markets, makes intraday calls for more margin. LCH restricts, mainly to cash, government bonds and

bank guarantees, the types of collateral that it will accept as initial margin. Cash margin payments are received and made by LCH via the Protected Payments System, or PPS (see below).

Clearing members allocate business to house accounts (for the members' own trades, related companies and non-segregated customers, if any) and to customer accounts (for segregated customers, if they have any). The two accounts are maintained and margined independently.

In the event that a default by a clearing member leads to LCH incurring a loss greater than the defaulter's margin, LCH has the following financial resources at its disposal:

- up to GBP 10 million of LCH's current year's profits;
- a cash-based default fund (GBP 335 million as at August 2002), to which all LCH members contribute;
- GBP 200 million of insurance cover; and
- own funds of over GBP 50 million.

Credit and liquidity risk control measures

In addition to the above, LCH sets minimum capital requirements for members. Members also have to satisfy LCH regarding their ability to meet day-to-day operational requirements, including the adequacy of their back office and banking arrangements. Trading levels and patterns are monitored throughout the day.

Participation in LCH's Protected Payments System (PPS)

As mentioned above, margin payments are made via LCH's PPS. Every clearing member maintains an account, or accounts, with at least one participating bank and LCH maintains accounts with all participating banks. Routine margin calls are made on the morning of T+1 (intraday calls on T). Once a bank has confirmed to LCH that it will make the margin payment required on the member's behalf, it is irrevocably committed to do so. Payments are made by internal branch transfers between the accounts of the clearing members and LCH at each participating bank, with final cash settlement taking place by 10 am on T+1. Intraday margin calls must be confirmed within an hour using the same process.

Transaction processing environment

LCH is linked electronically to the exchanges for which it acts as a CCP. SWIFT messages are used to transmit details of margin requirements to members' PPS banks.

4.3.2 European Central Counterparty (EuroCCP)

With the introduction of Nasdaq Europe's Hybrid Market system, EuroCCP expects to act as CCP to all trades executed on the exchange. Users of Nasdaq Europe's central limit order book must be either a direct EuroCCP Participant or have an indirect clearing relationship through a EuroCCP General Clearing Participant. Participation in EuroCCP is voluntary for members who trade elsewhere and report those trades to Nasdaq Europe. EuroCCP offers a cross-border service clearing both European and US securities. Settlement of the trades cleared by EuroCCP takes place in the designated home CSD of the security. EuroCCP provides optional settlement netting and supports clearing and settlement in multiple currencies.

Ownership and governance

EuroCCP is a wholly owned subsidiary of the US-based Depository Trust & Clearing Corporation (DTCC) and is run on a not-for-profit basis. A Board that has a majority of representatives of the user community governs the company.

Regulatory status

EuroCCP is an RCH subject to the supervision of the FSA under the FSMA 2000.

Financial resources

EuroCCP assumes counterparty default risk when it accepts trades into clearing and it covers the risk by requiring its participants to deposit collateral. The Participants' current and projected trading volumes and other risk-related criteria are taken into consideration when the required collateral deposit is calculated.

At the end of the day, EuroCCP recalculates the requirement of each Participant and, at the opening of business the following day, each Participant will be advised whether it needs to increase its deposit. EuroCCP reserves the right, however, to require any Participant to increase its deposited collateral intraday, should its exposure change. The collateral requirement is calculated on net positions by currency and must be initially provided in the calculated currency in cash. Other forms of collateral are being evaluated.

Participants can allocate business to principal accounts (for the Participant's own trades, related companies and non-segregated customers, if any) and to agency accounts (for segregated customers, if any). The two sets of accounts are maintained and collateralised independently.

In the event that a default by a Participant leads to EuroCCP incurring a loss greater than the collateral deposited by the defaulter, EuroCCP has the following financial resources at its disposal:

- the Participant Fund collateral deposits of the defaulting Participant;
- EuroCCP's retained earnings (if any);
- EuroCCP's excess operating revenues (if any); and
- a pro rata assessment against Participant Fund collateral deposits of all other Participants.

In addition, EuroCCP is currently exploring insurance cover as an additional resource.

Credit and liquidity risk control measures

In addition to the above, EuroCCP sets minimum capital requirements for participation. These vary between Individual and General Clearing Participants. In evaluating Participants' creditworthiness, EuroCCP also reviews operational and financial capabilities.

Daily payment flows

Transactions settle in the designated home market of the security and the payments for settlement activity are made in the appropriate currency through the payment mechanisms associated with the relevant CSD or ICSD.

EuroCCP holds accounts with its bank, in each of the admitted trading currencies, for collection of collateral. Collateral payments are made via bank-to-bank funds transfers to and from EuroCCP's bank accounts. Whether in respect of overnight or intraday calls, collateral payments must be made in accordance with a time schedule set by EuroCCP.

Transaction processing environment

As soon as a trade is dealt, it is automatically routed by Nasdaq Europe to EuroCCP for processing.

Output is available in respect of trades received from Nasdaq Europe in real time or batch mode, dependent upon each Participant's communication preference.

ISO7775 and ISO15022 format messages are used to report trade status and netting results, and to instruct settlement. ISO7775 and ISO15022 format messages are also used to report collateral requirements to participants. Intraday collateral calls are made via e-mail, fax and telephone.

4.4 Securities settlement systems

4.4.1 CREST

Ownership and governance

CREST was inaugurated on 15 July 1996, and was originally owned and operated by a private sector company, CRESTCo, which itself was owned by a range of CREST users. Following completion of the merger with Euroclear in September 2002, CRESTCo became a wholly owned subsidiary of Euroclear Bank.

Regulatory status

The dematerialisation of equities and other corporate securities was made possible by regulations made under Section 207 of the Companies Act 1989 - the Uncertificated Securities Regulations (USRs) 1995. Those regulations were amended in June 2000 to permit the integration of UK government stock (gilts) into CREST. The USRs were re-enacted with modifications in November 2001 to allow the introduction of electronic transfer of title (see below).

CREST is subject to regulation by the FSA, both as an RCH under the FSMA 2000 and as the Operator of a relevant system under the 2001 USRs. The merger with Euroclear has not affected the regulatory status.

Participation

Membership is open to bodies corporate and individuals regardless of domicile or location (except as mentioned below). Its membership comprises most firms active in the UK and Irish equity markets and the gilt market (or their custodians), and a large number of individuals.

In CREST terminology, there is a distinction between “participants” and “users”. Participants are those who hold securities in CREST (“members”) or who provide payment services (“settlement banks”) or registration services (“registrars”). Users are those who communicate with CRESTCo on behalf of participants. CRESTCo requires users to locate their gateway computers (the secure equipment used for sending/receiving electronic messages to/from CREST) in the United Kingdom, Ireland, the Isle of Man or, with the prior consent of CRESTCo, another EU member state.

Most corporate members maintain and operate their own securities accounts in CREST (“direct members”). “Personal members” (mainly individuals) maintain accounts in their own name, but use the facilities of a user (a “sponsor”) to communicate with CREST. Sponsors are required to be authorised under the FSMA 2000. Non-members of CREST which are active participants in the equity or gilt markets typically hold their accounts with custodians or brokers who are direct members of the system, although individuals may choose to hold their securities outside the system altogether, in paper form.

Applicants must enter a contractual agreement with CREST and arrange a daylight credit limit for payments settlement with an approved settlement bank. CRESTCo may require participants and users incorporated or resident outside the United Kingdom to provide a legal opinion confirming the participant’s or user’s ability to be bound by the terms of the agreement executed by CRESTCo and the participant or user.

Transactions handled

CREST settles the purchase, sale, loan and repo of UK and Irish equities and UK government and corporate debt. Moreover, through its links to other settlement systems in Europe and the United States, members are able to hold foreign securities. But the regulations governing CREST (ie the USRs) permit only the holding of securities governed by English, Scottish and Northern Irish laws (under a multi-jurisdictional approach, securities governed by Irish, Jersey, Guernsey and Isle of Man laws are held pursuant to the laws of those jurisdictions).

Accordingly, a transferee of a foreign security receives a CREST Depository Interest (CDI), an English law instrument representing the holder’s proprietary interest in the underlying foreign security, which is held on his behalf in the issuer SSS by a special purpose CREST nominee. A deed poll executed by CREST Depository Limited (CDL) sets out the holder’s right against the CDL to the underlying securities. The CDI holder has legal title to the CDI and beneficially owns the underlying foreign

security. CREST has the capacity to settle in multiple currencies and currently provides for settlement against sterling, euros and US dollars.

Operation of the transfer system

CREST accepts transfer instructions only from those legally entitled to give them; this is either the actual or intended legal owner of the assets in question, or somebody who has exhibited what is in effect a power of attorney from that owner. The terms of the transfer must be confirmed by both the transferor and the transferee, who input independent instructions into CREST which are matched before proceeding to settlement. The settlement process is continuous between 6 am and 4.35 pm London time, with settlement against payment ceasing at 4.05 pm. The system remains open for input and matching of forward-dated transactions until 8 pm. These timings are under constant review.

Transaction processing environment

All communication between CREST and members must currently occur via one of the two competing accredited network providers - SWIFT or BT Syntegra. In 2001, CREST reviewed the requirements set for CREST networks to ensure that providers could take advantage of new network technologies. Further accredited network providers are now being introduced, the first of these being the London Stock Exchange in July 2002.

Settlement procedures

Since 26 November 2001, CREST has provided real-time DVP with settlement in central bank money and irrevocable electronic transfer of title for securities denominated in sterling and euros. The USRs 2001 established the CREST records as the register for dematerialised UK securities (the Operator register), such that at the point of settlement in CREST the transferee/buyer receives immediate and irrevocable direct legal title to the dematerialised securities. CREST is not responsible for other functions carried out by securities registrars, such as dividend payments and other corporate events; the USRs require such registrars to keep a record of the Operator register for such purposes.

Also at the point of settlement, the CREST payment, which discharges the buyer's obligation to the seller, is accompanied by a simultaneous real-time payment from the buyer's settlement bank to the seller's across settlement accounts at the Bank of England. As a result, the buyer is solely exposed to the risk on their chosen settlement bank; and intraday risks between the settlement banks are eliminated. Settlement banks maintain separate accounts for CREST and "clean" payments (ie those arising other than from CREST). Settlement banks will balance (by means of liquidity transfers) their available funds between these accounts throughout the day according to the demands arising in CREST or from clean payments. At the start of each CREST settlement cycle, the liquidity balance on each settlement bank's CREST settlement account is irrevocably earmarked for CREST settlement.

Once CREST has identified a set of transactions for which sellers have stock, buyers have cash or credit, and buyers' settlement banks have sufficient earmarked RTGS liquidity, these transactions will be settled with finality. Only transactions where both stock and cash/credit are known to be available will be assessed for RTGS liquidity. Where available liquidity is insufficient, uncovered transactions will be left to be reassessed in the next CREST settlement cycle. Once stock has been transferred with legal title, and members' cash/credit positions updated within CREST, the Bank is notified of the dispositions of the earmarked liquidity and the resultant interbank RTGS transfers processed. Remaining earmarked liquidity is then released and any queued liquidity transfers effected. The earmarking process can then begin again.

In July 2002, the CCP service for SETS trades was expanded to include the option of settlement netting. As a result of this enhancement, CREST users who opt for the service will have only one settlement instruction to settle in each line of stock as a result of a day's trading. Netting only applies to sufficiently similar contracts; and the settlement (with LCH, as CCP) takes place on T+3, as for non-netted SETS trades.

Credit and liquidity risk control measures

CREST settlement banks are bound by contract to settle debts incurred in the CREST system by their customers. The settlement banks provide their customers with intraday credit in CREST, limiting their exposure by setting up debit caps within the system; CREST itself provides no credit facilities. The debit cap represents the maximum debit position which a settlement bank is willing to assume for a

given customer and is a combination of unsecured credit and credit advanced in return for charge over securities held by their customer in CREST.

To help increase the supply of liquidity available to the settlement banks intraday, CRESTCo and the Bank of England have introduced self-collateralising repo arrangements whereby a purchasing CREST member may use eligible securities (specifically UK government bonds) in the course of settlement to generate intraday sterling liquidity for its settlement bank.

Pricing policies

CRESTCo sets prices to cover its costs, including the cost of capital. Users of the system have received rebates from CRESTCo in recent years.

4.4.2 The Central Moneymarkets Office (CMO)

Ownership and governance

Ownership of the CMO system was transferred from the Bank of England to CRESTCo in September 1999.

Regulatory status

With the transfer of ownership to CRESTCo, the CMO system is subject to the same regulatory coverage as CREST.

Participation

Membership is open to all London money market participants subject to arrangements being made with a settlement bank to make payments on their behalf. There are currently 31 members of the CMO, which are drawn from a wide range of UK and overseas institutions. Over 200 firms also participate indirectly in the CMO through agency arrangements with CMO members.

Before joining the CMO service, each prospective member must enter into contractual agreements similar to those described in the case of CREST. CMO members have a book-entry account in their own name and make arrangements for a settlement bank to make and receive payments on their behalf for instruments transferred from and to other direct members.

Transactions handled

The CMO provides safekeeping and settlement facilities for sterling- and euro-denominated Treasury bills, local authority bills, bank bills, trade bills, bank and building society CDs and commercial paper. All of these instruments are immobilised in the CMO depository (which is operated on CRESTCo's behalf by the Bank of England), except for CDs, which are dematerialised using a contractual structure. Settlement occurs in real time by means of book-entry transfer between accounts in the CMO system.

Operation of the transfer system

Processing is continuous between 8.30 am and 4.45 pm London time, with settlement against payment finishing at 4.15 pm. Delivery of instruments is effected in real time following positive acceptance by the taker of the settlement instruction input by the giver (provided that the giver has the designated instruments on his CMO account).

Transaction processing environment

All communication between CMO members and the CMO system is by means of secure authenticated and encrypted electronic messages carried by Cable and Wireless.

Settlement procedures

Where a transaction is carried out against payment, the transfer of instruments between members simultaneously generates an instruction to the taker's settlement bank to pay the agreed amount to the giver's settlement bank. All such instructions are transmitted to the settlement banks following the payment deadline. Payment instructions generated by the CMO are not assured and may, in

exceptional circumstances, be rejected by the paying member's settlement bank, although this has not happened to date. Reversal of such payments is effected by an adjustment to the final end-of-day settlement calculation, provided notice is given to the Bank of England by 5 pm London time on the day the payment is due to be made. Transfers of instruments cannot be reversed.

The final transfer of instruments and the generation of any corresponding payment instructions occur simultaneously in real time throughout the day. Transfer of funds only becomes final, however, once the net credits and debits of the settlement banks are applied to their RTGS accounts at the Bank of England.

Credit and liquidity risk control measures

Arrangements for the settlement of payment instructions received and given by a settlement bank are for the member and its settlement bank to determine. In the event that a settlement bank fails or refuses to meet a payment instruction, the associated transfer of instruments will not be reversed by the CMO, which has no role in any subsequent negotiations between the parties to the transaction. In September 2002, the government published a consultation document which included proposals (and supporting draft legislation) for the dematerialisation of Treasury bills and other money market instruments. This will allow the closure of the CMO and the settlement of money market instruments in CREST subject to CREST DVP arrangements. The aim is to close the CMO at end-2003.

4.5 The use of the securities infrastructure by the Bank of England

The Bank of England uses CREST and the CMO to settle its daily open market (monetary policy) operations and to hold the RTGS collateral provided by its market counterparties.

**Payment systems in
the United States**

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List of abbreviations

ABA	American Bankers Association
CHIPS	Clearing House Interbank Payments System
CUSIP	Committee on Uniform Securities Identification Procedures
DTC	Depository Trust Company
DTCC	Depository Trust and Clearing Corporation
ECI	Extended Custodial Inventory (programme of the Federal Reserve)
EFAA	Expedited Funds Availability Act (of 1987)
EPN	Electronic Payments Network
ET	eastern time
FDIC	Federal Deposit Insurance Corporation
FICC	Fixed Income Clearing Corporation
FOMC	Federal Open Market Committee
FRA	Federal Reserve Act (of 1913)
GSCC	Government Securities Clearing Corporation
GSE	government-sponsored enterprise
MBSCC	Mortgage-Backed Securities Clearing Corporation
Nasdaq	National Association of Securities Dealers Automated Quotations
NCUA	National Credit Union Association
NOW	negotiable order of withdrawal (account)
NSSC	National Securities Clearing Corporation
NSS	National Settlement Service (of the Federal Reserve)
OTS	Office of Thrift Supervision
PSR	Payments System Risk (policy of the Federal Reserve)
S&L	savings and loan association
SEC	Securities and Exchange Commission
UCC	Uniform Commercial Code

Introduction

The development of the payment system in the United States has been influenced by many diverse factors. Firstly, there are numerous financial intermediaries that provide payment, clearing and settlement services. Over 20,000 deposit-taking institutions offer some type of payment service. Privately operated payment systems range from the localised interbank associations that clear cheques for their members or operate automated teller machine (ATM) or point of sale (POS) networks to the nationwide credit and debit card networks and a major “large-value” electronic funds transfer system. In addition, the central bank plays a significant role in the payment system through the provision of a wide range of interbank payment services.

Secondly, the legal framework governing payment activity as well as the regulatory structure for financial institutions that provide payment services in the United States is complex. Financial institutions are chartered at either the state or federal level, and are supervised by one or more agencies at the state or federal level, or both.

Thirdly, a variety of payment instruments and settlement mechanisms are available to discharge payment obligations between and among financial institutions and their customers. These payment instruments vary considerably in their characteristics, such as cost, technology, convenience, funds availability and finality, as well as in orientation towards consumer, commercial and interbank transactions. The large-value electronic funds transfer mechanisms are used to discharge the bulk of the dollar value of all payments in the United States. By contrast, the majority, by volume, of all payments in the United States, particularly those involving retail transactions, continues to be settled through the use of paper-based instruments, particularly cash and cheques. The use of electronic payment mechanisms, such as the Automated Clearing House (ACH) and ATM and POS networks, however, have been growing rapidly. In addition, innovation and competition have led to the use of new instruments and systems that rely increasingly on electronic payment mechanisms.

The size and complexity of financial markets in the United States have created significant payment and settlement interdependencies involving the banking system, money and capital markets, and associated derivative markets. Market participants and the Federal Reserve have for many years pursued measures to strengthen major US payment mechanisms, to increase processing efficiency, and to reduce payment system risks.

1. General institutional framework

1.1 General legal framework

State and federal statutes, regulations and case law govern the payment system in the United States. The relevant legal principles generally depend on the method of payment (paper-based or electronic) and in some cases the status of parties to a payment, for example consumer, merchant or financial institution.

Several federal laws, which are discussed further below, apply to payment activities, particularly in the consumer sector. At the state level, the Uniform Commercial Code (UCC) establishes a set of model statutes governing certain commercial and financial activities, including some banking and securities market transactions. Articles of the UCC pertinent to payment and settlement activities are the following: Article 3 (negotiable instruments), Article 4 (bank deposits and collections), Article 4A (funds transfers, including wholesale ACH credit transfers) and Article 8 (investment securities).¹ One of several versions of these Articles, sometimes with local variations, has been incorporated into the laws of all the states.

¹ Article 4A does not address transactions that are governed by the Electronic Fund Transfer Act of 1978 (primarily consumer electronic funds transfers).

In addition, the rules and membership agreements of private clearing and settlement arrangements provide a contractual framework for payment activity within the relevant governing law. For payment services that the Federal Reserve operates, Federal Reserve regulations and operating circulars specify the terms and conditions under which the services are provided.²

1.1.1 Cheques

Articles 3 and 4 of the UCC together form the legal basis of paper-based cheque transactions in the United States. In addition, Congress passed the Expedited Funds Availability Act of 1987 (EFAA), which granted the Federal Reserve Board authority to make improvements in the cheque collection and return system in the United States. In accordance with the EFAA, the Federal Reserve issued Regulation CC, which includes a number of provisions designed to improve and accelerate the collection and return of cheques among deposit-taking institutions. In addition to Regulation CC, cheques collected through the Federal Reserve are governed by subpart A of the Federal Reserve's Regulation J, which provides rules for collecting and returning items through the Federal Reserve.

1.1.2 Consumer electronic payments

The rights and liabilities of both consumers and financial institutions involved in consumer electronic payment transactions, including funds transfers through the ACH, ATM or POS networks, are governed by the Electronic Fund Transfer Act of 1978 and the Federal Reserve's Regulation E. Regulation E also sets standards for financial disclosure, card issuance, access and error resolution procedures applicable to all financial institutions. Other federal laws and policies affecting consumer use of electronic funds transfers include the Comptroller of the Currency's Consumer Protection Guidelines and the Truth-in-Lending Act (and the Federal Reserve's Regulation Z issued thereunder), which provide for the disclosure of costs and terms of consumer credit.

1.1.3 Fedwire and CHIPS

Payment transactions over the Federal Reserve's Fedwire funds transfer system are governed by the Federal Reserve's Regulation J, which incorporates the requirements of Article 4A of the UCC. Regulation J, in particular subpart B, defines the rights and responsibilities of financial institutions that use Fedwire, as well as the rights and responsibilities of the Federal Reserve. Federal Reserve Regulation CC also regulates the time within which a depository institution receiving a Fedwire or CHIPS funds transfer on behalf of a customer must make those funds available to their customer. In addition, Federal Reserve Operating Circular 6 covers items such as Fedwire operating hours, security, authentication, fees and certain restrictions.

Funds transfers made through the Clearing House Interbank Payments System (CHIPS) are subject to CHIPS rules and procedures. The CHIPS rules stipulate that the laws of the state of New York, which include Article 4A of the UCC, apply to CHIPS transactions.

1.2 Role of the Federal Reserve

The Federal Reserve Act of 1913 (FRA) established the Federal Reserve as the central bank of the United States and prescribed the general banking powers of the Federal Reserve. The Federal Reserve has responsibilities that encompass issuing notes, providing payment services, acting as fiscal agent and depository of the United States, supervising and regulating banking institutions and conducting monetary policy. The Federal Reserve System includes the 12 regional Federal Reserve Banks, located throughout the United States, and the Board of Governors, located in Washington, DC. The Board of Governors is responsible for the general supervision and oversight of the Federal Reserve Banks, which are separately incorporated entities.

² Federal Reserve Operating Circulars are available at www.frb-services.org/Industry/frIndustry.cfm.

1.2.1 Note issuance

Virtually all US dollar paper currency in circulation, or notes, is in the form of Federal Reserve notes. Notes are designed and produced by the United States Department of the Treasury's (US Treasury) Bureau of Engraving and Printing and are delivered to the Federal Reserve Banks for circulation. The Federal Reserve Board pays the US Treasury for the cost of printing notes.

The 12 Federal Reserve Banks are each authorised under the FRA to issue Federal Reserve notes to the public. Federal Reserve notes are fully secured by legally authorised collateral, principally US government securities held by the Federal Reserve, before being issued by the Federal Reserve Banks. The Federal Reserve Banks provide cash services to more than 9,600 depository institutions in the United States. The remaining depository institutions obtain currency and coin from correspondent banks rather than directly from the Federal Reserve. The Federal Reserve also distributes a large amount of currency to overseas markets through its Extended Custodial Inventory (ECI) programme, which was established in 1996. ECI locations are selected overseas institutions that hold US currency in their vaults but carry the inventory on the books of the Federal Reserve Bank of New York.

1.2.2 Payment services to deposit-taking institutions

The Federal Reserve Banks, including their 25 branches and 12 specialised (primarily cheque) processing facilities, compose the operational sites of the Federal Reserve. They provide a variety of payment and other services to deposit-taking institutions. Federal Reserve payment services include the distribution of currency and coin; the collection and return of cheques; the electronic transfer of funds and securities, including the processing of ACH payments; and the provision of a national settlement service. Individuals and institutions that do not take deposits are not generally permitted direct access to Federal Reserve payment services, although these entities may use these services indirectly as customers of deposit-taking institutions.

The Monetary Control Act of 1980 required the Federal Reserve to charge fees for certain payment services provided to deposit-taking institutions, including, cheque collection, ACH, Fedwire and the National Settlement Service. The Monetary Control Act also specified that the Federal Reserve was to set fees in such a way that revenues would recover the costs of providing payment services over the long run. The Federal Reserve is required to include in its calculation of costs not only its actual operating expenses, but also estimates of the taxes and cost of capital it would incur if it were a private firm, the so-called Private Sector Adjustment Factor.

1.2.3 Fiscal agency and depository services

The FRA provides that the Federal Reserve Banks will act as fiscal agents and depositories of the US government when required to do so by the Secretary of the Treasury. The Federal Reserve provides services on behalf of a number of domestic and international government agencies, but the majority of the fiscal and depository services the Federal Reserve Banks provide are performed for the US Treasury. As fiscal agents, the Federal Reserve Banks support the US Treasury with services related to the federal debt. For example, the Federal Reserve Banks receive bids for auctions of US Treasury securities to finance the federal debt and issue the securities in book-entry form. The Federal Reserve Banks also maintain the US Treasury's account, accept deposits of federal taxes and other federal agency receipts, and process cheques and electronic payments drawn on the US Treasury's account.

1.2.4 Supervision and regulation

As discussed further below in Section 1.3, a number of governmental bodies share the responsibility for supervising and regulating deposit-taking institutions in the United States. The Federal Reserve is the primary supervisor and regulator of all US bank holding companies, financial holding companies and state-chartered commercial banks that are members of the Federal Reserve System.³ The Federal Reserve is also responsible for the supervision of Edge Act and agreement corporations as

³ All federally chartered banks are members of the Federal Reserve System. A state-chartered bank may become a member of the Federal Reserve System by applying to the Federal Reserve. Each member bank is required to subscribe to the capital stock of the Reserve Bank of its District.

well as the operations of foreign banking organisations in the United States.⁴ To ensure the safety and soundness of the banking organisations that it supervises, the Federal Reserve conducts surveillance and on-site examinations and undertakes enforcement and other supervisory actions.

The Federal Reserve's regulatory responsibilities include the administration of laws governing the acquisition of banks, the non-banking activities of bank holding companies that are closely related to banking, mergers of both banks and bank holding companies, and certain other changes in control. The Federal Reserve is also responsible for issuing regulations to implement a number of statutes designed to ensure that consumers, including bank customers, have sufficient information and are treated fairly in credit and other financial transactions.

1.2.5 Monetary policy

The Federal Reserve, through the Federal Open Market Committee (FOMC), is responsible for formulating and implementing monetary policy. Monetary policy instruments include open market operations, the discount rate and reserve requirements for deposit-taking institutions.⁵ Open market operations are executed by the Federal Reserve Bank of New York, on behalf of the Federal Reserve System, under policy instructions from the FOMC. These operations take place through certain designated dealers in US government securities.

1.3 Financial intermediaries that provide payment services

Financial intermediaries that provide payment services in the United States include more than 20,000 deposit-taking institutions.⁶ These institutions can be classified as commercial banks or as thrift institutions, such as savings and loan associations and credit unions. These classifications determine what services financial institutions may provide and the regulatory structure to which the institutions are subject. Despite the large number of financial intermediaries, the banking system in the United States is somewhat concentrated at the national level. As of June 2001, the 10 largest commercial banking organisations held approximately 38% of the total value of insured deposits in the United States.

In 1999, Congress passed the Gramm-Leach-Bliley Financial Modernization Act of 1999 (Gramm-Leach-Bliley Act), which repealed significant restrictions enacted in the 1930s on the ability of banks to affiliate with securities and insurance firms. The Gramm-Leach-Bliley Act created a new structure called a "financial holding company", which may own subsidiaries engaged in banking and non-banking financial activities, including insurance and securities underwriting.

1.3.1 Commercial banks

Commercial banks accept demand and time deposits, make commercial loans and provide other banking services, including payment services, to the public. At year-end 2000, there were 8,273 commercial banks in the United States, with assets of approximately USD 6.2 trillion.⁷

Commercial banks may be chartered by state or federal authorities and are supervised and regulated by either state or federal supervisors, or, in some cases, by both. Federal supervisors include the

⁴ Edge Act and agreement corporations engage in international banking and investment activities. Edge Act and agreement corporations are chartered by the Federal Reserve Board under Section 25 of the Federal Reserve Act.

⁵ As of January 2003, discount window adjustment credit has been replaced with a new type of overnight or very short-term credit called "primary credit". The rate charged on this credit is known as the "primary credit rate", which will be set above the federal funds rate.

⁶ The term "depository institution", which is defined in Section 19(b)(1)(A) of the Federal Reserve Act, is more commonly used in the United States to refer to a deposit-taking financial institution, or one that accepts deposits.

⁷ In 1994, Congress passed the Riegle-Neal Interstate Banking and Branching Efficiency Act (Riegle-Neal Act), which generally permitted nationwide banking through bank holding companies and nationwide branching. As a result of the Riegle-Neal Act and individual state laws that eased restrictions on interstate bank branching beginning in the 1980s, a wave of mergers has occurred in the US banking market. The number of commercial banks in the United States declined by 14% from 1980 to 1990 and by more than 30% from 1990 to 2000.

Office of the Comptroller of the Currency of the US Treasury, the Federal Reserve and the Federal Deposit Insurance Corporation (FDIC). Generally, commercial bank deposits are insured by the Bank Insurance Fund administered by the FDIC. Banks pay risk-based deposit insurance premiums on uninsured as well as insured deposits.⁸ Commercial banks, like other deposit-taking institutions, are subject to reserve requirements established by the Federal Reserve.

1.3.2 Thrift institutions

At year-end 2000, there were 12,239 thrift institutions, with approximately USD 1.8 trillion in assets. Thrift institutions are savings and loan associations, credit unions and other savings institutions, such as federal mutual savings banks.

Savings and loan associations (S&Ls) accept savings and time deposits and make loans. S&Ls are federally or state-chartered and are required by law to make a certain percentage of their loans as home mortgages. They may be organised and owned by depositors, in which case they are called mutual associations, or they may be organised as stock-issuing corporations owned by shareholders. Legislation passed in 1980 and 1982 expanded the range of services S&Ls could provide to include making consumer loans, offering transaction accounts in the form of negotiable order of withdrawal (NOW) accounts, issuing credit cards and offering certain types of commercial loans. Federally chartered and some state-chartered S&Ls are insured by the Savings Association Insurance Fund, which is administered by the FDIC. S&Ls are supervised and regulated by the Office of Thrift Supervision (OTS) within the US Treasury.

Credit unions (state and federal) are cooperative organisations of individuals sharing a common affiliation, usually through employment with a particular company or organisation, or membership in a labour union or church. In 1984, credit union membership criteria were greatly relaxed, allowing credit unions to solicit more members.

Since the late 1970s, credit unions have been permitted to offer many of the same services as commercial banks. Credit unions accept deposits of members' savings in the form of share purchases and pay interest, in the form of dividends on the shares, out of earnings. Credit unions also provide loans to members and provide transaction accounts upon which share drafts can be drawn, much like NOW accounts. Federally chartered credit unions may provide and hold residential mortgages and issue credit cards. The National Credit Union Association (NCUA), an independent federal agency chartered in 1970, is the primary supervisor of federally chartered credit unions. The NCUA provides a central liquidity facility and also administers the National Share Insurance Fund, which provides deposit insurance for federal credit unions and many state credit unions.

Other savings institutions, such as federal savings banks, mutual savings banks and mutual stock banks, accept consumer deposits and invest primarily in residential mortgages and high-grade investment securities. Like S&Ls, these organisations may be owned by their depositors, in which case they are known as mutual savings banks, or they may be stock-issuing corporations owned by shareholders. Legislation passed in 1980 and 1982 gave these institutions the ability to offer NOW accounts and credit cards, to make commercial and consumer loans, to offer discount brokerage services and to invest in real estate without limitation. The OTS supervises and regulates these institutions.

1.3.3 Other institutions that provide payment services

Other organisations involved in providing payment services include so-called "non-bank banks", bank card companies and the United States Postal Service. Non-bank banks (or limited-service banks) can make loans or accept deposits, but cannot do both. Because of this distinction, a non-bank bank avoids meeting the legal definition of a bank as defined by the Bank Holding Company Act of 1956. This loophole was closed in August 1987 with the passage of the Competitive Equality Banking Act; non-bank banks in existence before 1987 were permitted to continue to operate under certain restrictions.

⁸ If an insured bank is closed, deposits up to and including USD 100,000 per account are generally covered by the FDIC.

Bank card companies license credit and debit card trademarks to financial institutions, authorise transactions and provide certain clearing and settlement services for transactions between banks. Visa and MasterCard are the two largest bank card networks operating in the United States, but many smaller bank card networks are common throughout the United States. Other card-issuing companies include national “travel and entertainment” card issuers and a number of major retailers that issue cards to their customers.

The United States Postal Service provides payment services by selling postal money orders, which can be used to make payments. The United States Postal Service issued 230 million postal money orders during 2000.

Other entities that play a role in the US payment system include those that provide specialised payment and settlement services and those that perform standard-setting or rule-writing functions. In 2002, private organisations providing payment and settlement services in the United States included the following: The Clearing House,⁹ several large cheque clearing houses, numerous local cheque clearing houses, three national ACH networks,¹⁰ 43 ATM networks and specialised financial intermediaries such as securities clearing corporations and depositories.

The National Automated Clearing House Association formulates and promulgates rules and standards for processing ACH transactions throughout the United States. In addition, regional ACH associations provide educational and promotional services to ACH participants.

The American Bankers Association (ABA) administers the system of routing numbers that are encoded on cheques and identify the bank responsible for payment of the cheque. These nine-digit routing numbers are now used for a variety of purposes, including identification of key parties to electronic payments such as ACH and Fedwire transfers. The Committee on Uniform Securities Identification Practices (CUSIP) designed a numbering system for securities under the auspices of the ABA. Standard & Poor’s administers the CUSIP system, under the oversight of the ABA.

2. Payment media used by non-financial entities

2.1 Cash

Cash (currency and coin) is a widely used payment medium for many types of transactions in the United States, particularly small-value transactions. The most commonly used forms of legal tender in the United States include coin, which is issued by the US Treasury, and Federal Reserve notes, issued by the Federal Reserve. Coins are minted in denominations of 1, 5, 10, 25 and 50 cents, and USD 1; Federal Reserve notes are issued in denominations of USD 1, 2, 5, 10, 20, 50 and 100.

At year-end 2000, the value of currency and coin in circulation was USD 594 billion, of which USD 564 billion was currency. US currency is also widely used outside the United States for transactions and as a store of wealth. Estimates indicate that approximately 45% of the value of US currency in circulation at year-end 2000 was held outside the United States. The total number of cash transactions per year in the United States cannot be determined with a reasonable degree of confidence.

⁹ The Clearing House (formerly known as the New York Clearing House Association) provides a range of large- and small-value electronic payment services, including the Clearing House Interbank Payments System (CHIPS), the Electronic Payments Network (EPN) and cheque clearing services.

¹⁰ One ACH network discontinued service in April 2002. A second ACH network announced it would be discontinuing operations in March 2003.

2.2 Non-cash payment media and instruments

2.2.1 Payment media

In the United States, the money balances used by consumers and non-financial businesses to effect transactions are generally held as transaction deposits at deposit-taking institutions. These typically take the form of demand deposits, such as chequing accounts, NOW accounts and credit union share-draft accounts. At year-end 2000, the value of transaction accounts held at depository institutions was USD 784.5 billion.

Other monetary balances that are less liquid but may nonetheless be used to fund payment activity include savings accounts, money market deposit accounts, certain small and large time deposits, money market mutual funds and liquid investment assets such as repurchase agreements and eurodollar deposits. Certain of these accounts, such as money market deposit accounts and mutual funds, may permit withdrawals of funds by cheque, often in minimum dollar amounts or in limited numbers. Savings deposits (including money market deposit accounts), retail money market mutual funds (general purpose only) and small time deposits totalled approximately USD 3.9 trillion at year-end 2000.¹¹ Large time deposits, balances in institutional money funds, repurchase liabilities issued by depository institutions and eurodollar deposits held by US residents totalled approximately USD 2.2 trillion at year-end 2000.

2.2.2 Payment instruments

(a) Paper cheques

The paper cheque is the most frequently used non-cash payment instrument in the United States. An estimated 42.5 billion cheques were written during 2000, valued at USD 39.3 trillion. Although the cheque remains the predominant type of non-cash payment instrument, the number of cheque payments and the number of cheque payments as a share of non-cash payments have declined over time. Data and statistical estimates provide strong evidence that the number of cheque payments in the United States during 2000 was lower than the number of cheque payments during 1995.¹² Estimates also suggest that individuals wrote about 58% of cheques during 2000, which accounted for about 22% of the total value of cheque payments. Businesses wrote about 37% of cheques, which accounted for about 72% of the value of cheque payments.

Private and public sector efforts to shift cheque payments to electronic media, such as ACH and payment cards, appear to be gaining ground. The expansion of online POS terminals and the widespread acceptance of credit and debit cards at retail establishments have presented consumers with significant payment alternatives to cheques. The Debt Collection Improvement Act of 1996 mandated that most federal government payments be made electronically starting in 1999. The US federal government made 262 million cheque payments during 2000, a 40% decline in cheque volume from the 436 million cheques the government wrote during 1996.

(b) ACH credits and debits

ACH transactions are a common form of electronic funds transfer used to make both recurring and non-recurring payments. Depository institutions originated 6.8 billion ACH transactions during 2000 for themselves and their customers, twice as many as were initiated during 1995. ACH payments may be either credit or debit transactions. In an ACH credit transaction, funds flow from the originator to the receiver, and in a debit transaction, funds flow from the receiver to the originator. ACH credit payments include direct deposit of payrolls, government benefit payments and corporate payments to contractors and vendors. The proportion of payroll payments made by businesses using the ACH was 50% in 2000. Debit payments include mortgage and loan payments, insurance premium payments, consumer

¹¹ Small time deposits are issued in amounts under USD 100,000. Large time deposits, which do not include eurodollar deposits, are issued in amounts of USD 100,000 or more.

¹² See Gerdes and Walton, "The use of checks and other non-cash payment instruments in the United States", *Federal Reserve Bulletin*, August 2002, pp 360-74.

bill payments and corporate cash concentration transactions.¹³ In addition, businesses and individuals may use the ACH to make payments to, or receive reimbursement from, the federal government related to federal tax obligations.

(c) *Funds transfers over Fedwire and CHIPS*

Fedwire and CHIPS are electronic credit transfer systems that are generally considered large-value payment systems. Depository institutions originated 168 million transfers using Fedwire and CHIPS during 2000, valued at USD 672 trillion. These systems are used by financial institutions for settling many financial market and a wide range of other types of transactions. With a few exceptions, non-deposit-taking financial institutions, as well as non-financial organisations and individuals, access these systems and originate payments through deposit-taking institutions. A 2000 survey indicated that about 80% of Fedwire volume and about 42% of Fedwire dollar value were attributable to such third-party transfers.

(d) *Card payments*

(i) *Credit cards*

Credit cards are the most frequently used electronic payment instrument in the United States. These cards combine a payment instrument with a credit arrangement. There were 20.5 billion credit card transactions processed during 2000, valued at USD 1.5 trillion. Bank credit cards are generally issued by a bank under a licence from a national organisation, such as Visa or MasterCard, and typically involve a revolving credit agreement. There were 9.5 billion bank credit card transactions during 2000. In addition to bank-issued cards, a number of other companies offer credit cards directly to businesses and consumers. These include Discover Card; national travel and entertainment cards, such as American Express; and limited-use proprietary cards, such as those issued by retail stores and oil and telephone companies.

A 1998 survey of consumers indicated that 68% of US households have at least one general purpose credit card, a 21% increase since 1989. In 1998, limited-use cards issued by retail stores and oil companies (generally limited to in-store use) were held by 50% and 19% of US households, respectively.

(ii) *Debit cards*

Debit cards transfer funds from a cardholder's transactions account (for instance, a chequing account) at an issuing bank. There were 9.5 billion debit card transactions processed during 2000, valued at USD 419 billion. Cardholders authorise debit card transactions either by entering a personal identification number (PIN) directly into a merchant's online terminal or by a written signature. An estimated 2.8 million online debit terminals were available at US retail locations in 2000. Approximately 4 billion PIN-based transactions were effected in 2000, processed primarily by Star, Interlink, NYCE and Pulse. Approximately 5.5 billion signature-based transactions were effected in 2000. The sole processors of signature-based debit transactions in the United States during 2000 were Visa and MasterCard.

3. Interbank exchange and settlement circuits

3.1 General overview

In the United States, interbank payments are processed and settled primarily through the following mechanisms: (1) cheque clearing, (2) ACH, (3) card networks, (4) same-day electronic funds transfer systems (Fedwire and CHIPS) and (5) the Federal Reserve's National Settlement Service (NSS).

¹³ Corporate cash concentration transactions are generally those initiated by an organisation to fund, or to consolidate funds from, its branches, franchises or agents.

Using these mechanisms, banks exchange and settle payments directly with each other, through private sector clearing houses, through correspondents, or through the Federal Reserve.

3.1.1 Cheque clearing systems

Depository institutions paid an estimated 42.5 billion cheques in the United States during 2000. Approximately 30% of those cheques were deposited in the same institution on which they were drawn and, therefore, were settled via accounting entries on the books of the paying institution. The remaining 70% were cleared and settled through interbank mechanisms. Approximately 43% of the cheques cleared through these interbank mechanisms were cleared through direct exchange (presentment), local cheque clearing houses and correspondent bank networks; the remainder were cleared through the Federal Reserve Banks.

(a) Operation of the cheque collection mechanism

Typically, deposit-taking institutions located in the same geographical area exchange cheques directly or participate in local cheque clearing arrangements. In 2001, there were approximately 66 private cheque clearing arrangements in which deposit-taking institutions exchanged cheques and used the Federal Reserve's NSS to settle the net positions of participants. A significant number of additional cheque clearing houses do not currently use NSS; however, these are typically smaller, local cheque clearing houses.

Cheques drawn on deposit-taking institutions located outside the geographical area of the collecting deposit-taking institution are frequently deposited by the collecting institution with correspondent banks or Federal Reserve Banks. Correspondent banks that have established relationships with other correspondent banks present cheques drawn on each other directly. Smaller institutions generally use the cheque collection services offered by correspondent banks or those offered by the Federal Reserve. Cheques cleared by the Federal Reserve Banks and correspondent banks are processed on high-speed equipment that itemises, records and sorts cheques based on information contained in the magnetic ink character recognition (MICR) line printed along the bottom of cheques.¹⁴

Cheques are transported between collecting institutions in a variety of ways. Cheques cleared locally are usually transported by ground couriers, while cheques drawn in regions distant from the institution in which the cheque is first deposited are generally delivered via air transportation. The Federal Reserve manages an extensive air transportation network to exchange cheques among its 45 cheque clearing centres and uses local courier networks to present cheques to paying institutions.

Correspondent banks settle for the cheques they collect for other institutions through accounts on their books. Paying banks generally settle with correspondent banks using the Federal Reserve's Fedwire funds transfer system. Cheque clearing houses generally net payments. Settlement among cheque clearing house participants generally occurs through transactions directly between members, through designated settlement banks, or through NSS.

The Federal Reserve settles for the cheques it collects by posting entries to the accounts that deposit-taking institutions maintain with the Federal Reserve. The account of the collecting institution is credited, and the account of the paying institution is debited, for the value of the deposited cheques in accordance with funds availability schedules maintained by the Federal Reserve, which reflect the time normally needed for the Federal Reserve to receive settlement from the institutions on which the cheques are drawn. Collecting institutions usually receive credit on the day of deposit or the next business day.

(b) Pricing policies

Typically, cheque clearing houses are non-profit, cooperative associations that assess their members the actual costs of operating the clearing house. Correspondent banks charge for their services in a

¹⁴ In 2001 the Federal Reserve announced a single MICR detail transmission standard that conforms to the ANSI ASC X9.37 format. The standard, to be adopted by mid-2005, will allow financial institutions and other processors to move essential cheque information more efficiently.

variety of ways, and there is little public information available concerning the fees assessed for their collection services.

Federal Reserve fees for cheque collection are based on the Federal Reserve's general pricing principles of cost recovery discussed in Section 1.2.2. Fees for cheque collection services vary based on the time and location of deposit and the amount of sorting performed by the depositing institution.

3.1.2 Automated Clearing House

The ACH is a nationwide electronic file transfer mechanism that processed 6.8 billion credit and debit transfers initiated by depository institutions through electronically originated batches during 2000. The Federal Reserve is the nation's largest ACH operator and processed more than 85% of the 4,253 million commercial interbank ACH transactions originated during 2000. Private sector ACH operators processed the remaining 615 million commercial interbank transactions originated during 2000. Based on announcements during the fourth quarter of 2002, The Clearing House's Electronic Payments Network (EPN) will be the sole private sector ACH operator beginning in March 2003.

(a) Operation of the ACH system

The Federal Reserve maintains centralised application software used to process ACH payments submitted to the Federal Reserve Banks. Deposit-taking institutions electronically deliver files to and receive files from the Federal Reserve Banks through a variety of electronic access options. Private sector operators and the Federal Reserve Banks rely on each other for the processing of some ACH transactions in which either the originating depository institution or the receiving depository institution is not their customer. These inter-operator transactions are settled by the Federal Reserve.

ACH transactions processed by the Federal Reserve are settled through deposit-taking institutions' accounts held at the Federal Reserve. Since June 2001, settlement for ACH credit transactions processed by the Federal Reserve Banks is final when posted to deposit-taking institutions' accounts, which is currently at 8.30 am eastern time (ET) on the settlement date. Credit for Federal Reserve ACH debit transfers is not final at settlement. Credit for debit items is available to the receiving deposit-taking institution at 11 am ET on settlement date, but is not final until the banking day following the settlement date. Federal Reserve ACH services are governed by Operating Circular 4, which incorporates the Operating Rules of the National Automated Clearing House Association. Transactions processed by EPN are settled on a net basis using NSS.

(b) Pricing policies

Federal Reserve fees for ACH are based on the Federal Reserve's general pricing principles of cost recovery discussed in Section 1.2.2. In 2003, fees charged by the Federal Reserve for ACH services offered to depository institutions for the origination of ACH transfers range from USD 0.0025 per item to USD 0.0030 per item based upon origination service provided. The Federal Reserve also charges depository institutions fees for file origination, account servicing, ACH settlement and receipt of ACH transactions, and surcharges for cross-border items. Prices may also vary for transactions that require the use of multiple networks for processing. Private sector ACH processors assess their members a variety of fees, including transaction fees, access fees and fees for non-automated services.

3.1.3 Card networks

Credit card, ATM and POS associations provide communications, transaction authorisation and interbank financial settlement for their member financial institutions. Bank card networks are typically owned by a group of financial institutions that provide initial capital and establish uniform operating policies, procedures and controls. Some major networks are owned by non-bank companies. The largest credit card and signature-based debit card networks in the United States are Visa and MasterCard. American Express and Discover Card are also major credit card networks. There were 45 ATM and POS networks operating in the United States during 2000, although consolidation is occurring among existing networks. Concord EFS National Bank and First Data Merchant Services Corporation are the largest providers of ATM and debit card services based on PINs.

(a) Operation of card networks

Credit card, ATM and POS associations sort and route transaction data from acquiring banks to issuing banks over proprietary networks. The associations generally settle on a net basis with the acquiring and issuing banks daily, although typically with a one- or two-day lag between payment initiation and settlement. Generally, the associations use the acquiring and issuing banks' aggregated transaction information to compile each bank's net settlement position. Member banks may be required to maintain collateral with the associations' settlement banks to manage default risks. Acquiring and issuing banks may settle directly with each other, through regional settlement banks or through the Federal Reserve, or by other net settlement arrangements. The settlement process can vary significantly, depending upon the member involved.

3.2 Major large-value funds transfer systems

There are two major large-value payment transfer systems in the United States: (1) Fedwire, operated by the Federal Reserve, and (2) CHIPS, operated by the Clearing House Interbank Payments Company L.L.C. (CHIPCo). Generally, these payment systems are used by financial institutions and their customers to make large-dollar, time-critical transfers. In addition, financial institutions may use separate communication systems to send payment instructions to their correspondents for the transfer of correspondent balances or to initiate Fedwire or CHIPS payments.

3.2.1 Fedwire funds transfer system

The Fedwire funds transfer system, owned and operated by the Federal Reserve Banks, is a real-time gross settlement system that enables participants to send and receive final payments in central bank money between each other and on behalf of customers. Fedwire processes and settles payment orders individually throughout the operating day. Payment to the receiving participant over Fedwire is final and irrevocable when the amount of the payment order is credited to the receiving participant's account or when notice is sent to the receiving participant, whichever is earlier.

An institution that maintains an account with a Federal Reserve Bank is generally allowed to be a Fedwire participant. Institutions with accounts at a Federal Reserve Bank may access Fedwire subject to the conditions detailed in Operating Circular 6 and the Federal Reserve Board's Payments System Risk (PSR) policy. Under subpart B of Regulation J and Operating Circular 6, the Federal Reserve Banks can also impose conditions on an institution's use of Fedwire. In particular, each Fedwire participant is required to enter into a security procedures agreement with its Federal Reserve Bank. An institution sending payment orders to a Federal Reserve Bank is also required to have sufficient funds, either in the form of account balances held at the Federal Reserve or overdraft capacity.

Fedwire processed an average of nearly 430,000 payments per day in 2000. The total value of transfers originated during 2000 was USD 380 trillion. The distribution of the value of these payments is not uniform. The median Fedwire payment during 2000 was approximately USD 25,000, and the average payment was approximately USD 3.5 million.

(a) Operation of the Fedwire funds transfer service

Fedwire funds transfers are generally initiated online, via an electronic connection to the Federal Reserve's communications network, but may be initiated offline, using a telephone-based service. Participants that send and receive large numbers of messages typically use a computer interface connection with the Federal Reserve, providing the depository institution with significant automation and high levels of straight through processing.

Approximately 9,500 participants are currently able to initiate or receive funds transfers over Fedwire. Of these 9,500 participants, fewer than 350 have a computer interface connection, about 7,850 are connected through other online electronic options, and the remainder use the offline service.

The Fedwire funds transfer system operates from 12.30 am to 6.30 pm ET, Monday to Friday, excluding designated holidays. The deadline for third-party transfers, those initiated or received by a participant on behalf of a customer, is 6 pm ET. Offline transfers generally cannot be initiated before 9 am or after 6 pm ET (5.30 pm for third-party transfers). Operating Circular 6, which is noted above, contains time schedules, holidays and guidelines pertaining to the extension of Fedwire hours.

(b) *Risk management*

Intraday central bank credit in the form of daylight account overdrafts is available to holders of accounts at the Federal Reserve Banks, including participants in Fedwire, under the Federal Reserve Board's PSR policy. Many Fedwire participants use daylight credit to make payments throughout the operating day. Overall, aggregate average daylight overdrafts averaged USD 30 billion per day in 2000, and aggregate peak daylight overdrafts averaged USD 90 billion per day.

Because funds transfers over Fedwire settle in central bank money with immediate finality, credit risk to the receiving institutions is eliminated. To the extent that the Federal Reserve Banks provide daylight credit to a Fedwire participant, they expose themselves to direct credit risk from participants. The Federal Reserve Board's PSR policy controls and mitigates these exposures, while providing sufficient liquidity to account holders for making payments. The PSR policy provides for risk assessments, net debit caps, daylight overdraft fees and, in certain cases, collateralisation to limit daylight credit exposure.

(c) *Pricing policies*

Federal Reserve fees for the Fedwire service are based upon the Federal Reserve's general pricing policies of cost recovery discussed in Section 1.2.2. Since 1999, Fedwire funds transfers have been priced using a volume-based fee schedule. This policy was established to reflect more accurately the cost structure of Fedwire services. In particular, Fedwire is characterised by high fixed costs and low marginal costs. Currently, Fedwire transaction fees are charged to both the originating institution (debit side) and receiving institution (credit side). In 2003, the fees charged by Reserve Banks for an online Fedwire transaction range from USD 0.10 to USD 0.30 per transfer, per institution. A surcharge of USD 15 is required to initiate or receive an offline transfer. Electronic access fees (connection and terminal charges) are assessed separately.

3.2.2 Clearing House Interbank Payments System (CHIPS)

CHIPS began operation in 1970 as an electronic replacement for an existing paper-based payments clearing arrangement. Since 1998, CHIPS has been owned and operated by CHIPCo. All CHIPS participants are members of CHIPCo. CHIPCo is governed by a 10-member board; four members are elected by CHIPS participants based on their volume, and the remaining six are appointed by The Clearing House.

Since its inception, CHIPS has undergone several changes to its payments processing structure. Most recently, CHIPCo converted CHIPS from an end-of-day, multilateral net settlement system to one that provides real-time final settlement for payment orders as they are released from the CHIPS payment queue during the operating day. As discussed below, payment instructions submitted to the CHIPS payment queue that remain unsettled at the end of the day are tallied and funded on a multilateral net basis prior to releasing the payments.

Participation in CHIPS is available to commercial banking institutions or Edge Act corporations that meet the requirements detailed in Rule 19 of CHIPS Rules.¹⁵ CHIPS participants are subject to supervision by state or federal banking supervisors and CHIPS itself is examined annually by state and federal banking authorities. A non-participant wishing to send payments over CHIPS must employ a CHIPS participant to act as its correspondent or agent. At year-end 2000, the CHIPS network had 63 participants.

The payments transferred over CHIPS are often related to international interbank transactions, including the dollar payments resulting from foreign currency transactions (such as spot and currency swap contracts) and eurodollar placements and returns. Payment orders are also sent over CHIPS for the purpose of adjusting correspondent balances and making payments associated with commercial transactions, bank loans and securities transactions. Participants used CHIPS to process an average of about 236,000 payments per day during 2000. The total value of transfers originated during 2000 was USD 292 trillion.

¹⁵ CHIPS Rules are posted on the CHIPS website at www.chips.org.

(a) Operation of CHIPS

Since January 2001, CHIPS has been a real-time final settlement system that continuously matches, nets and settles payment orders. On a daily basis, the new system provides real-time finality for all payment orders released by CHIPS from the CHIPS queue. To achieve real-time finality, payment orders are settled on the books of CHIPS against positive positions, simultaneously offset by incoming payment orders, or both.

To facilitate this process, the Federal Reserve Bank of New York established a CHIPS prefunded balance account (CHIPS account). Under the real-time finality arrangement, each CHIPS participant has a pre-established opening position requirement, which, once funded via a Fedwire funds transfer to the CHIPS account, is used to settle payment orders throughout the day.¹⁶ A participant cannot send or receive CHIPS payment orders until it transfers its opening position requirement to the CHIPS account. Opening position requirements can be transferred into the CHIPS account any time after the opening of CHIPS and Fedwire at 12.30 am ET; all participants must transfer their requirement no later than 9 am ET.

During the operating day, participants submit payment orders to a centralised queue maintained by CHIPS. An optimisation algorithm searches the centralised queue for payment orders to settle, subject to restrictions contained in CHIPS Rule 12. When an opportunity for settlement involving one, two or more payment orders is found, the optimisation algorithm releases the relevant payment order(s) from the central queue and simultaneously marks the CHIPS records to reflect the associated debits and credits to the relevant participants' positions. Participants may remove payment orders from the queue at any time prior to the daily cutoff time for the system (5 pm ET). Debits and credits to the current position are reflected only in CHIPS's records and are not recorded on the books of the Federal Reserve Bank of New York.¹⁷ Under New York law and CHIPS Rules, payment orders are finally settled at the time of release from the central CHIPS queue.

At 5 pm ET CHIPS attempts to match, net, set off and release as many of the remaining payment orders as possible, although no participant is allowed to incur a negative position. As soon as this process is complete, any unreleased payment orders remaining in the queue are tallied on a multilateral net basis. The resulting net position for each participant is provisionally combined with that participant's current position (which is always zero or positive) to calculate the participant's final net position; if that position is negative, it is the participant's "final position requirement".

Each participant with a final position requirement must transfer, via Fedwire, its requirement to the CHIPS account. These requirements, when delivered, are credited to participants' balances. Once all of the Fedwire funds transfers have been received, CHIPS is able to release and settle all remaining payment orders. After completion of this process, CHIPS transfers to those participants who have any balances remaining the full amount of those positions, reducing the amount of funds in the CHIPS account to zero by the end of the day.

(b) Risk management

CHIPS requires participants to deposit a predetermined amount each day, before the start of business. During the operating day, CHIPS does not release any payment order unless it can be debited against the participant's current position, and no participant's current position is permitted to fall below zero. All payment orders are final upon release to the receiving participant. To ensure that CHIPS participants have access to sources of credit and liquidity sufficient to pay promptly each day their opening position requirements and their closing position requirements, CHIPS has credit criteria for participants. Prospective participants must be regulated by the New York State Banking Department or a federal bank regulatory authority to ensure that participants are examined on a regular basis and are operating in a sound manner, and prospective participants are subject to a credit evaluation by CHIPCo. CHIPS participants are also required to file copies of their annual financial statements with, and are subject to a periodic review by, the CHIPCo board.

¹⁶ CHIPCo, using a formula based on the latest transaction history of each participant, establishes the amount of a participant's opening position requirement.

¹⁷ Once fully funded by opening position requirements, the amount of funds in the CHIPS account on the books of the Federal Reserve Bank of New York does not increase or decrease until the delivery of final position requirements after 5 pm ET.

3.2.3 Federal Reserve National Settlement Service

The Federal Reserve allows participants in private clearing arrangements to settle transactions on a net basis using account balances held at the Federal Reserve. Users of the Federal Reserve's National Settlement Service (NSS) include cheque clearing houses, ACH networks and some bank card processors. In 2002, more than 70 local and national private sector clearing and settlement arrangements used NSS to settle a netted value of about USD 15 billion daily.

NSS provides operational efficiency and reduces settlement risk to participants by providing for intraday settlement finality within the limitations established in the Federal Reserve's Operating Circular 12. NSS offers finality that is similar to that of the Fedwire funds transfer service and provides an automated mechanism for submitting settlement files to the Federal Reserve. It also enables Federal Reserve Banks to manage and limit risk by incorporating risk controls on extensions of daylight credit that are as robust as those used in the Fedwire funds transfer service.

(a) Operation of the NSS

To use NSS, a settlement agent for a settlement arrangement transmits a settlement file electronically to the Federal Reserve using an electronic connection. The file contains a listing of the participants, the settlers (either the participant itself or the participant's correspondent) and the dollar amount of the debit or credit to be posted to the settler's account. If various validity checks are satisfied, the Federal Reserve accepts the file for processing and sends an acknowledgment to the agent. NSS files are accepted for processing and settlement between 8.30 am and 5.30 pm ET. Files submitted earlier than 8.30 am are queued for processing beginning at 8.30 am.

Each debit balance on the settlement file is checked against the account balance and intraday credit available to the settlers. In some instances, debit balances may be rejected if a settler does not have a sufficient balance, or sufficient intraday credit, to cover the debit. When all debit entries on the settlement file have been posted, NSS posts the credit balances. All postings are final and irrevocable when functioned. When all credits have been posted, the settlement for that file is complete and an acknowledgment message is sent to the settlement agent.

(b) Pricing policies

Federal Reserve fees for NSS are based upon the Federal Reserve's general pricing policies of cost recovery discussed in Section 1.2.2. In 2003, the Federal Reserve charges a USD 14 fee for each settlement file submitted and a USD 0.80 per-entry fee for each item on the file. Arrangements that incur total per-entry and per-settlement charges of less than USD 60 per month are charged a minimum monthly fee of USD 60.

4. Securities settlement systems

4.1 Trading

The major securities markets in the United States are the government securities market, the corporate equity market and the fixed income market. The commercial paper market is an important short-term funding market. These instruments are generally traded either through recognised exchanges or through over-the-counter dealer markets. The mechanisms for clearance and settlement vary by type of instrument and generally involve specialised financial intermediaries, such as clearing corporations and depositories. Participants in these markets include securities issuers, intermediaries such as brokers, dealers, and depository institutions, and investors such as insurance companies, investment companies, non-financial corporations and individuals.

4.1.1 US government securities

US government securities are issued by the US Treasury. In addition, certain individual federal government agencies issue securities, as well as federal government-sponsored enterprises.¹⁸ At year-end 2000, there were USD 5.7 trillion US government securities outstanding, of which USD 28 billion were issued by federal agencies other than the US Treasury.

As fiscal agents of the United States, the Federal Reserve Banks act as the issuing and paying agent for these securities. US government securities are issued in book-entry form through the Federal Reserve's Fedwire Securities Service using either an auction process or dealer syndicate mechanisms.

US Treasury securities are issued through regularly scheduled auctions. The Federal Reserve Banks serve as conduits for the auctions, with the Federal Reserve Bank of New York coordinating much of the auction activity. Individuals, corporations and financial institutions may participate in the auctions. Participation in Treasury auctions, however, is typically concentrated among a small number of dealer firms, known as primary dealers.¹⁹ The primary dealers are required to participate meaningfully in both open market operations and US Treasury securities auctions.

The secondary market for government securities is an over-the-counter dealer market in which participants trade with one another on a bilateral basis rather than on an organised exchange. Trading activity takes place between primary dealers, non-primary dealers and customers of these dealers including financial institutions, non-financial institutions and individuals. The majority of transactions between primary dealers and other large market participants are conducted through inter-dealer brokers that provide both anonymity and price information to market participants. Approximately 2,000 securities brokers and dealers are registered to operate in the US government securities market.²⁰

4.1.2 Corporate securities and commercial paper

Corporate securities (equities and fixed income) are traded on various established exchanges that have specific exchange rules and regulations. The primary securities exchanges in the United States are the New York Stock Exchange, the National Association of Securities Dealers Automated Quotations (Nasdaq) and the American Stock Exchange. At year-end 2000, there was USD 18.2 trillion in outstanding securities listed on these three securities exchanges.

The Securities and Exchange Commission (SEC) oversees key participants in the corporate securities market, including stock exchanges, broker-dealers, investment advisers, mutual funds and public utility holding companies. The SEC is concerned primarily with promoting disclosure of financial information of publicly traded companies, enforcing the securities laws and protecting investors who interact with these various organisations and individuals.

Commercial paper is a debt instrument issued by prime-rated commercial and financial companies with a maturity ranging from two days to 270 days.²¹ As of year-end 2000, there were USD 1.6 trillion commercial paper obligations outstanding. Commercial paper is issued through dealer placements or direct placements with investors. Although commercial paper is a negotiable instrument, secondary market trading is limited.

¹⁸ Government-sponsored enterprises (GSEs) are private corporations created by Congress to address public policy concerns about the ability of members of certain groups to borrow sufficient funds at affordable rates. GSEs do not receive federal funds and rely primarily on debt financing for their day-to-day operations.

¹⁹ Primary dealers are designated trading counterparties for the Federal Reserve Bank of New York in its execution of market operations to carry out US monetary policy. As of December 2002, there were 22 designated primary dealers. See Federal Reserve Bank of New York, *Administration of relationships with primary dealers*, 22 January 1992, www.ny.frb.org/bankinfo/regrept/primary.html.

²⁰ These firms are registered with the SEC, as required by the Government Securities Act of 1986, which establishes a comprehensive legal framework regulating all government securities brokers and dealers.

²¹ Provisions in the Securities Act of 1933 exempt commercial paper with a maturity not greater than 270 days from the requirement that it be registered with the SEC.

4.2 Clearing

4.2.1 US government securities

Two private sector clearing corporations facilitate the comparison and netting (clearance) process for trades of US government securities: (1) the Government Securities Clearing Corporation (GSCC) compares and nets trades of US Treasury and agency debt securities, and (2) the Mortgage-Backed Securities Clearing Corporation (MBSCC) compares and nets trades of mortgage-backed securities.²² GSCC and MBSCC are wholly owned operating subsidiaries of the Depository Trust and Clearing Corporation (DTCC). DTCC is governed by a board composed of 21 directors who also serve as directors of the company's operating subsidiaries. Seventeen directors are from participants; two are designated by DTCC's preferred shareholders, the National Association of Securities Dealers and the New York Stock Exchange; and the remaining two are the chairman and chief operating officer of DTCC itself.

For trades submitted to GSCC and MBSCC for comparison, the process begins as soon as the information about the trades is received. Trades that are successfully compared result in binding and enforceable obligations to settle trades. Comparison results include compared and un-compared transactions, as well as advisories, which inform participants of trades submitted against them for which they did not make a corresponding submission. Trades can often be changed until matched. If a repurchase agreement has been compared, any change or deletion requires agreement by both trading partners.

For institutions that use GSCC's or MBSCC's netting service, all trades of eligible securities that are successfully compared are netted against an offsetting net receive or deliver obligation arising from another member's trading activity. Upon the determination of netted positions, GSCC interposes itself between the original trading parties and becomes the legal counterparty for settlement purposes to the GSCC participants. MBSCC engages in multilateral position netting and does not stand in the middle of transactions.²³

4.2.2 Corporate securities and commercial paper

The National Securities Clearing Corporation (NSCC) clears the vast majority of corporate equity and municipal bond transactions in the United States. NSCC handles all aspects of the clearance and settlement of trades between brokers and dealers in securities traded on the New York Stock Exchange, the American Stock Exchange, certain regional exchanges and in the over-the-counter market; it also provides clearing services to issuers of mutual funds. NSCC is a wholly owned operating subsidiary of DTCC.

Trades are reported to NSCC by either the exchanges or the dealing counterparties. Trades submitted to NSCC by recognised exchanges are considered "locked-in" (irrevocable) at submission. Trade data submitted directly by the dealing counterparties are compared by NSCC. Matched trades become irrevocable, while un-compared trade data may be revised at any time until a match is obtained. NSCC guarantees the completion of matched trades.²⁴

NSCC rules specify that all book-entry eligible funds and securities transactions submitted to NSCC for netting be given to or received from NSCC as counterparty. Between the period of NSCC's guarantee of trade settlement and final settlement of trades, the obligations of the original counterparties run to NSCC rather than to one another.

²² A significant portion of mortgage-backed securities have some kind of US government agency backing. MBSCC has merged with and into GSCC, and GSCC's name has officially changed to the Fixed Income Clearing Corporation (FICC). FICC officially began operations in January 2003.

²³ For further information about GSCC and MBSCC, see www.gsc.com and www.mbscc.com, respectively.

²⁴ Further information about NSCC's clearance processes can be found at www.nsc.com.

4.3 Settlement

4.3.1 *US government securities*

As fiscal agents, the Federal Reserve Banks act as the securities depository for all marketable US Treasury securities, many federal agency securities and certain mortgage-backed securities issued by GSEs.²⁵ These securities generally exist in book-entry form only. Depository institutions may maintain book-entry securities accounts at the Federal Reserve, in which they hold their own securities and those of customers. Issuances of these securities and secondary market trades are settled over the Federal Reserve's Fedwire Securities Service or on the books of a depository institution.

The Federal Reserve's Fedwire Securities Service is a real-time, DVP gross settlement system which allows for immediate, final and simultaneous transfer of securities against funds. Transfers are initiated by the sender of the securities and result in a simultaneous debit and credit to the sender's securities and funds accounts, respectively, maintained at the Federal Reserve. The depository institution designated as the recipient in a securities transfer receives a simultaneous credit and debit to its securities and funds accounts, respectively, maintained at the Federal Reserve. The Fedwire Securities Service generally operates between 8.30 am and 3.30 pm ET. There are more than 9,000 participants in the system. In 2000, participants transferred 13.6 million securities valued at USD 188.1 trillion.

4.3.2 *Corporate securities and commercial paper*

Most corporate securities, as well as commercial paper, are immobilised at the Depository Trust Company (DTC). DTC is a wholly owned subsidiary of DTCC and is organised as a limited purpose trust company under New York banking law. DTC is a member of the Federal Reserve System and a registered clearing agency with the SEC.

DTC is the world's largest securities depository, holding about USD 20 trillion in securities for its participants and their customers at year-end 2000. DTC's network links more than 11,000 broker-dealers, custodian banks and institutional investors, as well as transfer agents, paying agents and exchange and redemption agents for securities issuers. In 2000, DTC processed over 230 million book-entry deliveries valued at more than USD 116.4 trillion.

A small volume of instruments in the United States still settle by the physical exchange of securities and funds. These securities are often not easily converted to a book-entry or depository system as a result of unique characteristics. Settlement occurs directly between counterparties or, at times, through physical presentment in a clearing house arrangement.

²⁵ The Federal Reserve also acts as agent and depository for the securities of certain international organisations, such as the World Bank.

**International payment
arrangements**

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1. SWIFT

1.1 Introduction

The Society for Worldwide Interbank Financial Telecommunication (SWIFT) is an industry-owned limited liability cooperative society set up under Belgian law and controlled by its member banks (including central banks) and other financial institutions. SWIFT's business is to supply secure messaging services and interface software, to contribute to greater automation of financial transaction processes and to provide a forum for financial institutions to address issues of common concern in the area of financial communication services. Messaging services are provided to banks, broker/dealers and investment managers, as well as to market infrastructures in payments, treasury, securities and trade.

SWIFT was founded in 1973 by 239 banks from 15 countries. Since then, there has been a steady increase in the number of financial institutions and countries connected to SWIFT. By the end of 2002, more than 7,400 financial institutions from 198 countries were connected. There are three categories of SWIFT users: members (shareholders), sub-members (ie subsidiaries controlled by members) and participants. Members can benefit from all the services offered by SWIFT, whereas participants only have restricted access to a range of services that relates to their business. Types of participants include securities brokers and dealers, investment management institutions, fund administrators, money brokers and various other institutions, mainly from within the securities business. By the end of 2002, SWIFT provided services to 2,203 members, 3,079 sub-members and 2,183 participants.

In 2002, SWIFT carried over 1.8 billion messages. Average daily traffic is above 7 million messages. The average daily value of payment messages on SWIFT is estimated to be above EUR 6 trillion.

1.2 Governance

SWIFT has an Executive Board of up to 25 directors which is responsible for governing the company. The Board of Directors oversees the Executive, a team of full-time employees headed by a Chief Executive Officer. The Board of Directors has seven committees with delegated decision powers: Audit and Finance, Banking and Payments, Compensation, 'E', Securities, Standards, Technology and Production. The Audit and Finance Committee (AFC) has six Board Directors and is a governance and oversight body for systems security, internal control and financial policy. The AFC meets four to five times per year with the Executive, the Director of Audit and Risk Assurance and external auditors to review systems security, accounting policy, reporting, auditing and control matters, as well as the evolution of the balance sheet, subsidiaries and financial projections. The AFC has powers delegated from the Board in these matters.

SWIFT has two separate mandates for external audit: a financial audit mandate and a security audit mandate. The mandates of the external auditors are decided by the AFC.

In addition, SWIFT facilitates or performs an annual audit of its services to some of the market infrastructures it supplies. Market infrastructures with audit and assurance clauses include CREST, CLS, ECB/TARGET, EBA/EURO netting, LCN Spain and Bolero.

SWIFT has ongoing dialogues with its users through national member groups, user groups and dedicated working groups, which can be involved in activities like reviewing standards proposals, providing industry comments or proposing network implementation time frames and scenarios.

1.3 Oversight

The international dimension of SWIFT's activities is reflected in the oversight arrangements in place. The oversight of SWIFT is based on a special arrangement agreed by the central banks of the G10 countries. Under this arrangement, the National Bank of Belgium (NBB), the central bank of the country in which SWIFT's headquarters are located, acts as lead overseer of SWIFT, supported by the G10 central banks. The NBB is responsible for the day-to-day oversight relationship with SWIFT. The CPSS is briefed on the outcome of the oversight of SWIFT and may provide direction to the overseers about what to focus on during their oversight activities.

The primary focus of the oversight of SWIFT is on the security and operational reliability of the SWIFT infrastructure. Concretely, the objective of the oversight of SWIFT is to confirm that SWIFT has put in place appropriate structures, processes, risk management procedures and controls to effectively manage the risks it may pose to financial stability and to the soundness of financial infrastructures. In this context, governance, management and operations of SWIFT are also reviewed.

The NBB organises at least twice a year a high-level meeting between senior representatives from a selection of G10 central banks and the SWIFT senior management and SWIFT board representatives. The G10 central banks bring forward issues that may arise from the oversight process and make recommendations, suggestions and proposals to SWIFT. SWIFT explains any relevant measures it has taken or plans to take in response to the overseers' suggestions.

This oversight does not grant SWIFT any certification, approval or authorisation. SWIFT continues to bear the responsibility for the security and reliability of its systems, products and services.

1.4 SWIFT messaging

SWIFT is the most widely used payment services provider worldwide. As the main carrier for payment information, its message types, formats and technical infrastructure set a kind of benchmark for the processing of payments.

SWIFT's core application is called FIN, a store-and-forward messaging service. In 2002, availability of FIN was consistently above 99.99%. FIN traffic can be broken down as follows:¹

FIN traffic distribution by market

– payments	60.7%
– securities	30.5%
– treasury	6.0%
– trade finance	2.4%
– system	0.4%

FIN traffic distribution by region

– Europe	66.6%
– Americas	18.0%
– Asia-Pacific	11.7%
– Africa	2.4%
– Middle East	1.2%

In 2002, SWIFT started the migration of its core FIN application from an X.25 network (a network technology that is becoming obsolete) to an IP-based network. With the introduction of IP-based technologies, SWIFT will expand its services base, offering new interactive services.

The suite of new services is grouped under SWIFTNet services. SWIFTNet business solutions that are currently being developed relate to cash reporting, bulk payments processing and securities reporting. To promote the use of SWIFTNet and XML-based cash reporting tools among major cash clearing banks and their correspondents, a working group has been set up to design the industry solution and to agree upon query/response standards and a rule book. In bulk payments, a new XML-based message standard was developed and introduced in 2002. In 2001 the first domestic market infrastructures went live on SWIFTNet. The SWIFTNet messaging services using the new Secure Internet Protocol Network (SIPN) were fully implemented by the Deutsche Bundesbank's RTGS^{plus} and the Bank of England's Enquiry Link.

In the world of e-commerce, SWIFT is developing some of the tools necessary to deliver the value that the internet can offer to the financial industry and is also working with member institutions to develop e-payment initiation standards.

¹ December 2002 YTD figures.

1.5 Market infrastructures

SWIFT provides messaging and connectivity services to a growing number of market infrastructures: CLS, netting services (eg Euro 1 and STEP 1 of the Euro Banking Association), stock exchanges (eg Euronext), CSDs (eg CREST), CCPs (eg LCH), ICSDs (Euroclear, Clearstream) and RTGS systems.

In the European Union, SWIFT provides the messaging service of the TARGET Interlinking Network that connects the RTGS systems of the 15 central banks participating in TARGET, as well as the messaging for a large part of the national RTGS systems themselves: ELLIPS (Belgium), KRONOS (Denmark), BOF-RTGS (Finland), TBF/PNS (France), HERMES (Greece), IRIS (Ireland), BIREL (Italy), LIPS (Luxembourg), SPI (Spain) and RIX (Sweden). In August 2001, NewCHAPS, the United Kingdom's RTGS system for sterling and euro clearing, moved to FIN copy. The Deutsche Bundesbank's RTGS^{plus} system went live on SWIFTNet and FIN copy in November 2001.

2. Visa International

2.1 The organisation

Visa International is a private, for-profit membership association owned by 21,000 financial institutions worldwide. It consists of six regional divisions: Asia-Pacific; Canada; Central & Eastern Europe, Middle East & Africa (CEMEA); European Union; Latin America & Caribbean; and United States. Membership is limited to deposit-taking financial institutions and to bank-owned organisations operating in the bank card sector, such as Carte Bleue in France and Servizi Interbancari in Italy.

Visa is managed by an international board and by six autonomous regional boards. The international board is responsible for global policy; it provides the operating regulations and by-laws and manages a worldwide electronic system which handles authorisations and the transmission of clearing and settlement data. The regional boards have full autonomy in defining commercial policies and promoting Visa products within their geographical areas. Member institutions market and issue cards to their customers in accordance with their own decisions. In particular, it is up to Visa members to set and charge fees and interest, to decide on credit and spending limits and to choose which benefits should be offered to their cardholders.

2.2 The services

Visa provides the global platforms, systems and processing services needed by members to develop and run card payment businesses. It also contributes to the establishment of standards for global interoperability and security and new technologies in the card payments industry.

Visa has developed a portfolio of products - from ATM cash cards and electronic purses to debit and credit cards. It includes PLUS, Visa Electron, Visa Classic, Visa Gold, Visa Platinum, Visa Infinite and Visa traveller's cheques. Visa has also created a range of commercial cards like Visa Purchasing for large companies and Visa Business for smaller companies.

2.3 Technical, organisational and clearing aspects

2.3.1 Data transmission

VisaNet is the computer and telecommunications network which links Visa's member financial institutions worldwide with the two Visa Interchange Centres. Each of these centres is capable of processing every Visa transaction in order to ensure the regular working of the system should a disaster put one out of action. Two applications are managed through VisaNet: the Base I authorisation service and the Base II clearing and settlement service. VisaNet is operated by Inovant, Visa's information technology and processing services subsidiary.

2.3.2 Authorisation

Before a transaction is finalised, a series of security checks is carried out through VisaNet in order to ensure that the card is valid; has not been lost, stolen or forged; the cardholder's spending limit has not been exceeded; and the cardholder's personal identification number (PIN), if used, is correct. The Visa authorisation service operates 24 hours a day, seven days a week.

2.3.3 Clearing and settlement procedures

The Visa International Base II system clears transactions and facilitates settlement. It operates six days a week. To complete such calculations, Visa International supports approximately 180 transaction currencies, thus enabling the processing of international transactions. Members can choose to receive their transaction reports in any of these currencies.

Twenty-six currencies can be used in the net settlement between Visa International and the participating members, the choice of currency being decided by each member involved in the settlement. The necessary foreign exchange operations are executed with two banks, one located in London (Barclays) and one in New York (Citibank).

Settlement is not carried out through Base II; Visa merely provides the data to allow settlement to be carried out. For settlement in US dollars, Chase Manhattan Bank, New York, acts as the settlement bank. For multicurrency settlement, Chase Manhattan Bank, London, acts as the settlement bank. All members may hold their own settlement account with any other financial institution, such that all requests for funds or payments are ultimately settled through the correspondent services of domestic clearing and settlement systems.

2.4 Other developments

The global Visa Secure e-Commerce Initiative was announced in 2000 to improve the security of cardholder data and guarantee the identity of buyers and sellers on the internet. The initiative includes the following programs: the Visa Account Information Security Program, the Best Business Practices Program and the Visa Authenticated Payment Program. The first two programs establish standards and best practices for e-commerce merchants, allowing them to ensure the security of cardholder data on their sites. The Visa Authenticated Payment Program is designed to identify and authenticate cardholders on the internet using either the Three-Domain Secure (3-D Secure) protocol or the SET protocol. The term "Three-Domain Secure" refers to the three areas of a payment card transaction flow: i) cardholders and their banks (the issuing domain); ii) merchants and their banks (the acquiring domain); and iii) between the banks themselves (the interoperability domain). This model gives banks a choice in selecting the technology they use to authenticate their cardholders and merchants. Interoperability between the issuer and the acquirer is achieved through the use of a common protocol.

Visa is a cofounder of the Mobile Payment Forum, a non-profit making cross-industry organisation launched in November 2001 with the aim of creating a framework for standardised, secure and authenticated mobile payments, based on payment card accounts. The Forum currently has over 100 member organisations from the banking, telecommunications and mobile industries.

Anticipating continuing strong growth in payments worldwide, Visa will enhance its technological platform VisaNet in the future around a new framework called the VisaNet Distributed Processing Solution (VDPS). It will operate over an IP-based network which is being implemented globally. VDPS is designed to upgrade current hardware and software to speed up the implementation of new applications, allow faster expansion of transaction authorisation capacity, and take advantage of streamlined clearing and settlement. It will also enable each of Visa's six regional organisations, starting with the EU region, to install, administer and customise hardware and software in regionally dedicated data centres, giving them the ability to roll out local product and service innovations more quickly in order to take advantage of local opportunities.

Key Visa statistics

As of 30 September 2002

	Worldwide total	Asia-Pacific	Canada	CEMEA	European Union	Latin America & Caribb	United States
Transaction data for the 9 months ending on 30 September 2002							
Purchase transactions							
Value (USD billions)	1,522.8	220.3	61.9	14.1	446.3	41.5	738.7
Cash transactions							
Value (USD billions)	862.6	173.2	7.1	72.1	245.8	132.8	231.8
Total transactions							
Number of transactions (millions)	33,352	3,434	961	1,077	10,833	2,906	14,141
Change vs same period one year ago (as a %)	14.6	26.3	4.6	38.6	14.2	14.7	11.6
Value of transactions (USD billions)	2,385.4	393.4	69.0	86.1	692.1	174.2	970.5
Status data as at 30 September 2002							
Customer base							
Number of accounts (millions)	811.3	157.1	19.2	37.5	180.7	118.6	298.2
Number of cards (millions)	960.2	177.3	26.5	41.6	198.5	131.2	385.0

Note: Includes all card programmes (Classic, Premium, Commercial/Business, Electron, Credit and Debit Programmes). Excludes Interlink.

Source: *Visa International Quarterly Statistical Report*.

3. MasterCard International

3.1 The organisation

MasterCard International and Europay International merged under the name MasterCard International on 1 July 2002. MasterCard was established in 1966 as the Interbank Card Association. Europay International SA was established in Belgium in 1992. Before the merger, both MasterCard International and Europay International were membership associations. In the new corporate structure, MasterCard International is the primary operating subsidiary of MasterCard Incorporated. Principal members of MasterCard International own the shares of MasterCard Incorporated.

MasterCard International has approximately 25,000 MasterCard, Cirrus and Maestro members. MasterCard International owns, manages and licenses international retail product brands as well as manages an international telecommunications network and processing centre. Its corporate headquarters are located in Purchase, New York. Regional headquarters are located in Waterloo, Singapore, Miami and Dubai.

MasterCard International provides three major services for its member institutions. It establishes standards for acceptance and settlement of transactions, it provides a communications network for electronic funds and information transfer, and it supports marketing efforts of the member institutions, both from a MasterCard brand perspective and an individual institution perspective.

Member institutions market and issue cards to customers and make their own decisions about pricing and marketing (issuing activity). They also sign up and provide services to merchants which accept cards and make their own decisions about the discount rate (acquiring activity).

3.2 The services

MasterCard offers a range of cashless payment services. As of June 2002, there were approximately 520 million MasterCard branded cards worldwide and approximately 433 million Maestro branded cards worldwide. A range of credit card facilities is available under the MasterCard brand name. All MasterCard cards are accepted worldwide.

MasterCard offers the MasterCard/Cirrus/Maestro branded products. These products include both POS and ATM products. The MasterCard/Cirrus/Maestro services form a worldwide debit service. MasterCard owns the MasterCard/Cirrus ATM network. It has approximately 800,000 locations where customers can obtain cash at banks or ATMs. Maestro is a global PIN-based debit service that allows customers to pay at the point of sale and to obtain cash at ATMs.

MasterCard International provides prepaid cards that may be used at any location where MasterCard cards are accepted. MasterCard International also provides traveller's cheques, which are primarily issued by a single member bank. The traveller's cheques are accepted at retailers displaying the appropriate logos.

3.3 Technical, organisational and clearing aspects

3.3.1 Data transmission

MasterCard International operates BankNet, the telecommunications network that links members and processing centres. BankNet routes transactions for authorisation. Its Virtual Private Network (VPN) enhances BankNet by reducing authorisation time. In addition, in 2001, MasterCard International opened its Global Technology and Operations facility, a new payments processing centre located in the United States. It combined four separate operations facilities into one central processing centre.

3.3.2 Authorisation

The method of authorisation of the transaction depends partly on the payment instrument used to initiate the funds transfer. Processing time for the MasterCard International portion of authorisation is less than two seconds.

3.3.3 Clearing and settlement procedures

MasterCard International introduced its Global Clearing Management System in 2002. Net settlements are generally conducted daily among members of MasterCard International by wire transfer. However, some transactions may not settle until one to four calendar days after the transaction occurs. MasterCard International requires some members to post collateral to mitigate settlement risk.

3.4 Other developments

MasterCard International is actively involved in various initiatives and working groups concerning new technological developments. In October 2002, MasterCard International announced a new smartcard application based on the specifications promulgated by EMV 2000. EMVCo publishes specifications for the use of EMV smartcards and terminals for secure payments over the internet (www.emvco.com).

MasterCard International is also a founding member of the Global Mobile Commerce Team - a group of industry leaders working together to identify issues and propose solutions for the mobile commerce sector in order to facilitate the provision of secure, interoperable mobile payments.

MasterCard International has developed a number of products specifically for use on the internet. It developed an authentication standard and an associated data transport mechanism in order to increase security of information transmission for members. It also developed the Site Data Protection

Service, which helps internet merchants reduce fraud risks by identifying potential weaknesses and fixing problems in merchant internet infrastructure.

Key Mastercard statistics

As of 30 September 2002, includes all card programmes except online debit programmes

	World-wide total	Asia/Pacific	Canada	South Asia/Middle East/Africa	Europe	Latin America	United States
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Transaction data for the 9 months ending on 30 September 2002

Purchase transactions							
– value (USD billions) ¹	580.3	89.1	19.2	3.9	130.8	16.1	321.2
– change vs same period one year ago (as a %) ²	14.4	7.3	19.1	23.1	13.3	16.9	16.6
Cash transactions							
– value (USD billions) ³	251.4	76.8	4.2	1.7	41.8	8.4	118.5
– change vs same period one year ago (as a %) ²	20.3	19.7	23.2	23.2	14.4	49.1	21.0
Total transactions							
– number of transactions (millions)	9,844.9	1,114.9	355.0	120.6	2,737.7	517.6	4,999.1
– change vs same period one year ago (as a %) ²	nav	nav	nav	nav	nav	nav	nav
– value of transactions (USD billions) ⁴	831.7	165.9	23.4	5.6	172.6	24.4	439.7
– change vs same period one year ago (as a %) ²	16.1	12.7	19.8	23.1	13.6	26.3	17.8

Status data as of 30 September 2002

Customer base							
– number of accounts (millions)	482.1	101.2	17.6	6.4	75.4	34.9	246.7
– change vs 30 September 2001 (as a %) ²	nav	nav	nav	nav	nav	nav	nav
– number of cards (millions) ⁵	578.8	110.8	23.2	7.3	84.7	43.9	308.9
– change vs 30 September 2001 (as a %) ²	nav	nav	nav	nav	nav	nav	nav

¹ The aggregate dollar amount of purchases made with MasterCard-branded cards for the relevant period. ² Period-over-period rates of change are calculated solely on the basis of local currency information in order to eliminate the impact of changes in the value of foreign currencies against the US dollar in calculating such rates of change. ³ The aggregate dollar amount of cash disbursements obtained with MasterCard-branded cards for the relevant period. ⁴ Represents purchase volume plus cash volume and includes the impact of balance transfers and convenience cheques. ⁵ Includes virtual cards which are MasterCard-branded payment accounts in connection with which functional cards are not generally issued.

Source: MasterCard Incorporated SEC Form 8-K, 13 November 2002.

4. CLS Bank International

CLS Bank International, New York, New York (CLS Bank) is an Edge Act corporation organised under the laws of the United States, and chartered and supervised by the Federal Reserve. CLS Bank is a wholly owned subsidiary of CLS UK Intermediate Holdings Ltd, a limited company incorporated under the laws of England and Wales that provides certain corporate services to CLS Bank and its affiliated companies. CLS Group Holdings AG (CLS Group Holdings) is a company incorporated under the laws of Switzerland and regulated by the Federal Reserve as a bank holding company in the United States. CLS Group Holdings is the group holding company of CLS UK Intermediate Holdings Ltd, CLS Bank, and CLS Services Ltd (CLS Services). CLS Services is a limited company incorporated under the laws of England and Wales that provides operational and back office support to CLS Bank and its affiliated companies.

CLS Bank was formed to provide multicurrency payment services that will reduce substantially the risk to financial institutions of settling foreign exchange contracts. CLS Bank currently provides settlement for foreign exchange transactions involving the Australian dollar, the pound sterling, the Canadian dollar, the euro, the Japanese yen, the Swiss franc and the US dollar.

CLS Bank represents an important advance in risk reduction for foreign exchange settlement. CLS Bank eliminates the principal risk that one leg of a foreign exchange transaction would be settled and the other would not by providing for the simultaneous settlement on its books of both legs of a foreign exchange transaction on the basis of payment versus payment. To facilitate its multicurrency operations, CLS Bank maintains an account at each of the central banks whose currencies it settles.

4.1 Operation of CLS Bank International

Daily operations are carried out by CLS Bank and its operations affiliate, CLS Services. Foreign exchange settlement instructions are settled on the books of CLS Bank, which contracts out most of its processing to CLS Services. CLS Services manages and maintains the technical infrastructure necessary to operate CLS Bank.

On a daily basis, CLS Services receives, validates and matches foreign exchange settlement instructions and determines whether they are eligible for settlement at CLS Bank. On the date prior to the settlement (value) date, CLS Services transfers all eligible instructions to CLS Bank. Instructions to be settled by CLS Bank must normally be submitted by midnight Central European Time (CET) on the day before settlement. Each CLS Bank settlement member holds an account at CLS Bank that is divided into subaccounts for each currency that the settlement member settles. Beginning at 7 am CET on settlement day, CLS Bank settles instructions individually on the members' accounts by simultaneously debiting the subaccount of the currency being sold and crediting the subaccount of the currency being bought. These debits and credits are final upon execution of the transfers on the books of CLS Bank. Over the course of the day, as instructions are settled, settlement members accumulate net debit balances in currencies where they and their customers are net sellers and net credit balances in those where they and their customers are net purchasers.

Members must submit payments to CLS Bank to provide funds in the correct currencies to cover projected net debit positions. They can do so by making a single payment for the full amount at 8 am CET or a series of payments in hourly instalments. CLS Bank makes payouts throughout the settlement day to members in currencies in which they have a net credit position, subject to the constraint that the sum of all currency balances (positive and negative) in a member's account, converted into US dollars, is not negative. Payouts are made according to an algorithm that, among other things, accords priority to members and currencies with the highest balances.

To execute payins and payouts from CLS Bank's central bank accounts, settlement members and CLS Bank utilise each central bank's respective RTGS system to transfer funds. In normal circumstances, settlement members will have zero balances in their CLS Bank accounts at the end of each day, and CLS Bank will have zero balances in its central bank accounts at the end of each day.

4.2 Risk management

CLS Bank complies with the Federal Reserve Board's Policy Statement on Payments System Risk, which incorporates the minimum standards found in the Report of the Committee on Interbank Netting

Schemes of the Central Banks of the Group of Ten Countries. CLS Bank does have certain residual liquidity, credit and operational risks, which must be viewed in the context of the overall risk reduction CLS Bank achieves in foreign exchange settlement. These risks are managed by standard risk management tools, including membership requirements, account position limits, haircuts on positions, committed backup facilities and loss-sharing arrangements.

CLS Bank does not guarantee that all instructions submitted will be accepted for settlement. As the CLS system works its way through the queue of payment instructions waiting to be settled, only instructions that pass all of CLS Bank's risk controls will be settled through the system. Instructions remaining in the queue at the end of settlement period are returned to the sender.

CLS Bank imposes aggregate short position limits on account balances that are member specific and are determined by an assessment of a member's credit, liquidity and operational capabilities. CLS Bank also imposes currency-specific short position limits on account balances whose levels are directly related to CLS Bank's committed liquidity facilities in that currency. The CLS system design ensures access to sufficient liquidity from contracted liquidity providers in the event of a failure to pay required amounts by any single member, even if the member also serves as one of the liquidity providers. CLS Bank could incur losses in the unlikely event that a member fails to make a required payment to CLS Bank and exchange rate movements exceed the haircuts CLS Bank has built into the system to guard against risk from extreme exchange rate movements. In such cases, CLS Bank would employ its loss-sharing arrangement.

5. Euroclear

5.1 Institutional and legal aspects

5.1.1 The Euroclear System

The Euroclear System is operated by Euroclear Bank SA, a Belgian credit institution with its registered office in Brussels. From its creation in 1968 until the end of 2000, the Euroclear System was operated by the New York State bank Morgan Guaranty Trust Company of New York (MGT), via the Belgian branch of that establishment, which had a branch of activities ("Euroclear Operations Centre") specially dedicated to the operation of the Euroclear System. MGT transferred this branch of activities to Euroclear Bank, a new Belgian credit institution that was set up in 2000 for the specific purpose of operating the Euroclear System. Euroclear has developed a non-exclusive partnership with Euronext (resulting from the merger of the stock exchanges of Paris, Amsterdam and Brussels), which enabled Euroclear in 2001 to acquire 100% of the capital of Sicovam, the French CSD and operator of the settlement system Relit and RGV, and in 2002 100% of the capital of Necigef, the Dutch CSD. On this occasion, Euroclear also took a 20% stake in the capital of Clearnet, the French credit institution responsible for the clearing of Euronext transactions, and in 2004 Euroclear will acquire most of the settlement and custody business of CIK, the Belgian CSD. Since December 2000, Euroclear has also assumed responsibility for the settlement of Irish government bonds (Gilts) following the decision of the Irish government and the Central Bank of Ireland to delegate this activity to Euroclear.

In September 2002, Euroclear Bank acquired 100% of the capital of CRESTCo, the British CSD which operates the real-time settlement systems settling UK, Irish and international securities through the CREST system, and money market instruments through the Central Money Markets Office (CMO). More details on the role of Euroclear Bank in the ongoing consolidation process in the European capital markets are given in the euro area chapter of this publication.

Euroclear Bank provides both ICSD and securities settlement services, including new issues distribution. In addition, it provides other services such as custody, securities lending and money transfer. Acting as a limited purpose bank, it also provides the system participants with the banking services directly bound to the settlement activity, including credit, securities lending and borrowing and collateral management services.

In 2001, the Euroclear Group had a turnover exceeding EUR 130 trillion and settled more than 161 million transactions (pre-netted). The total value of securities held in custody was almost

EUR 8,000 billion. There are over 208,000 different issues of securities accepted in the Euroclear System issued by entities from over 110 different countries.

5.1.2 Oversight and prudential supervision

Incorporated in Belgium, Euroclear Bank is subject to the supervision of the Belgian Banking and Finance Commission (BFC). In accordance with Article 8 of its Organic Law, the National Bank of Belgium (NBB) is in charge of the oversight of the Euroclear System. Supervisors and overseers work in close cooperation in the implementation of their respective responsibilities at Euroclear Bank. Euroclear plc (see below) is also authorised as a service company by the Financial Services Authority in the United Kingdom.

As a consequence of the ongoing consolidation process, a cooperative oversight framework based on Memoranda of Understanding (MoU) between interested authorities was created. The international cooperation, which is based on the lead oversight and lead supervision principle, currently involves relevant authorities from France, the Netherlands and Ireland. The cooperation agreements aim at allowing each authority to implement its own competencies, promote the efficiency of the controls through a homogeneous approach and streamline the requirements to Euroclear avoiding redundancies.

5.1.3 Governance

Euroclear is market-owned and market-governed. Euroclear Group reshaped its corporate structure in 2000 and 2001, transforming the Belgian company Euroclear Clearance System Société Coopérative into Euroclear Bank SA/NV, which now operates the Euroclear System and provides the services previously contracted to Morgan Guaranty Trust Company of New York, Brussels branch. Euroclear Bank is owned by Euroclear plc, a company organised under the laws of England and Wales (owned by market participants).

Both Euroclear plc and Euroclear Bank have independent Boards of Directors. Composed of representatives of Euroclear users (major securities market actors), and of former shareholders of merged companies (Euroclear France and CRESTCo), the Euroclear plc Board makes the strategic decisions for the group. It decides in particular on the strategic investments and on joint ventures and alliances. As shareholders' voting rights are limited to 5%, widespread user governance of the Euroclear System will be sustained. The Board is assisted by several committees comprising Non-Executive Directors.

The Euroclear Bank Board is composed of 18 Directors, 12 of whom are Non-Executive Directors and are also members of the Euroclear plc Board. The six Executive Directors represent the Bank's Management Committee. The Euroclear Bank Board sets the policies and objectives of the Bank, ensures their implementation by the Management Committee and reviews its performance. These policies include among others pricing, risk management and membership admission.

5.1.4 Participants

The Euroclear System currently has about 2,000 participants from more than 80 different countries, the vast majority of which are banks, broker-dealers and other institutions professionally engaged in managing new issues of securities, market-making, trading or holding the wide variety of securities accepted by the System. Applicants must meet four criteria to be admitted:

- adequate financial resources;
- technological ability to use the Euroclear System;
- need to use the Euroclear System;
- sound reputation in the market.

In addition, internal anti-money laundering measures of the applicant institution are considered prior to any admission.

5.1.5 Legal basis

Securities transfers through the Euroclear System are based on contractual arrangements supported by a specific statutory basis. Euroclear services are offered to the participants pursuant to the Terms and Conditions Governing the Use of Euroclear, as well as the Operating Procedures of the Euroclear System. Those terms and conditions include right of setoff and right of retention on the participants' assets deposited in the Euroclear System. The rules of the Euroclear System, which are governed by Belgian law, explicitly refer to the provisions of Royal Decree (RD) no 62 dated 10 November 1967 facilitating the circulation of securities, as amended. The RD governs the deposit, transfer and pledge of securities held on a fungible basis. Banking services offered to the participants by Euroclear Bank (eg credit, collateral management and treasury services) are governed by separate contracts. The credit contracts organising the limited purpose of the credit lines as well as the related collateral arrangements also fall within this contractual framework.

The legal environment sustaining Euroclear's activities also includes the provisions of the Law dated 28 April 1999, which implements the EU Settlement Finality Directive 98/26/EC into the Belgian legal framework, Euroclear having been officially designated as a system falling under the provisions of this Law. This Law addresses more specifically the issues related to the contractual irrevocability of transfer orders, the exclusion of the "zero hour" rule and the upholding of the enforceability of collateral arrangements.

5.1.6 Asset protection

The contractual and legal protections cover different types of risk, in particular by preventing the securities held by the participants from becoming part of the assets of the custodian or being attached by creditors of custodians or of participants.

RD no 62 organises the co-ownership right of the participants in the book-entry pool of fungible securities credited to their account with Euroclear ("interest in securities"). More precisely, a participant has direct co-ownership rights, not over specific securities, but over all securities of the same type held in the Euroclear System on a fungible basis on behalf of all participants having a position in the relevant type of securities. As a result, each Euroclear participant has the enforceable right against Euroclear Bank to "revindicate" (obtain the return in kind) the same amount and category of securities that is standing to the credit of its Euroclear Securities Clearance Account, even in case of failure or insolvency of Euroclear Bank. Furthermore, if there were a shortage in the availability of securities to participants, securities of the same kind that are separately owned by Euroclear Bank would be taken out of its estate to be distributed to participants. Thus, Euroclear Bank has no ownership interest in securities held in the Euroclear System and securities held in the Euroclear System never become part of the estate of Euroclear Bank.

Securities subdeposited abroad by Euroclear Bank as operator of the Euroclear System with a custodian or an SSS have to be held in an identifiable and segregated fashion in order to ensure that the depository does not acquire any ownership right over the securities. Formal legal opinions under the laws of 32 countries where assets are subdeposited confirm that the securities would not be part of the general assets of the depository or the local clearance system and that those assets should not be subject to successful attachment by the creditors of those entities. This protection against the depository's failure complements the protection that Euroclear participants have under Belgian law for their securities held in the Euroclear System against the risk of bankruptcy of Euroclear Bank.

If securities held in the system were lost as a result of Euroclear's negligence, Euroclear would be liable towards the participants that have suffered a loss caused by its negligence. Euroclear does not, however, accept liability for the negligence or wilful misconduct of third parties, including subdepositories. Under the loss-sharing provision in the Terms and Conditions, the loss of securities caused by any event alien to any negligence on the part of Euroclear would be shared among the participants holding a position in the particular security issue in the Euroclear System. This loss-sharing mechanism has to date never had to be invoked. There are a number of procedures, controls and recourses in place making the materialisation of such a loss for the participants actually highly unlikely. Euroclear Bank is also required to take all such steps as it shall reasonably deem appropriate (including the bringing of legal proceedings) to effect a recovery of any securities loss on behalf of affected participants. In addition, subdepositories as well as Euroclear itself maintain comprehensive insurance coverage that may be available to cover potential related damages.

5.1.7 Collateral protection

Banking services offered to the participants in connection with the use of the Euroclear System (eg credit, treasury services, collateral management services) are governed by separate contracts. As a rule, the credit extended by Euroclear Bank is secured through contractual pledges over assets held in participants' accounts with Euroclear.

In addition, Article 31 of the Belgian Law of 2 August 2002 on the supervision of financial markets provides for a statutory lien in favour of the Euroclear System operator. Applicable to participants' assets (consisting of the balance of all securities in securities clearance accounts, and the balance of all cash in cash accounts) held in the Euroclear System (with the exception of assets held for customers and identified as such), Article 31 permits the recovery of all debts to the operator related to securities clearance and settlement activity, as well as the immediate realisation of securities and cash, and the recovery of loaned securities.

Euroclear has obtained several legal opinions from legal counsel under the laws of more than 42 countries representing the countries of incorporation of participants with whom Euroclear has most of its exposures confirming that under the conflict of laws rules of those countries, Belgian law should govern the validity and enforceability of Euroclear's security interest in the collateral and that underlying securities would not be subject to any successful attachment, levy, garnishment or other similar judicial procedure or other encumbrance by or in favour of any adverse claimant.

In this respect it is also important to note that Euroclear is a designated system for the purposes of the application of the Settlement Finality Directive (in particular Article 9) and of implementing national legislation.

5.2 Operational aspects

5.2.1 Types of transactions handled

Over 190,000 national and international securities are accepted in the System, covering a broad range of internationally traded fixed and floating rate debt instruments, convertibles, warrants and equities. This includes domestic debt instruments, short- and medium-term instruments, equities and equity-linked instruments as well as international bonds from the major markets of Europe, Asia-Pacific, Africa and the Americas.

Euroclear participants can confirm, clear and settle trades by book-entry in more than 40 settlement currencies on a simultaneous DVP basis.

5.2.2 Operating hours

The Euroclear Overnight Securities Settlement Process (overnight process) includes two overnight securities settlement processings which take place before settlement date S (from 22:00 (S-1) until 23:30 (S-1) and from 01:00 (S) until 02:30 (S)). The overnight process is followed by early morning cash reporting which enables participants to manage their cash positions during the day. In addition to the overnight processings, since September 2000 a real-time settlement has been running each business day between 04:00 and 18:00.

5.2.3 Settlement procedures

About 90% of the transactions processed in the systems are settled in the overnight process. Settlement efficiency exceeds 99%. After each securities settlement processing, Euroclear provides participants with a report of settled and unsettled securities transactions and, at the beginning of each business day, with a report of positions resulting from the overnight processing. Settlement is effected trade by trade, with each specific instruction attempted independently according to its priority order. The number of transactions successfully settled is optimised through dynamic recycling of securities and cash positions throughout the securities settlement processing. In order to enable participants to settle as many matched transactions as possible, participants may specify the priority that controls the order in which their instructions are processed. They may also segregate or link instructions as back-to-back settlements.

Real-time settlement is possible for internal settlement and most cross-border trades. It allows for, upon receipt of the instruction from the participant, both the recycling of previously unmatched or unsettled transactions and the processing of new instructions for same day settlement. All instructions for real-time settlement which are not settled at the end of the process are automatically recycled for settlement in the next batch process but not vice versa.

5.2.4 Delivery versus payment

The Euroclear System achieves DVP by “gross simultaneous settlement of securities and funds transfer” (BIS “Model 1” classification). The system is based on the concept of book-entry settlement. 75% of the Euroclear turnover settles on its own books, 12.5% on the “Bridge” with Clearstream Banking Luxembourg (CBL) and 12.5% settles externally.

5.2.5 Internal settlement

Transactions between Euroclear participants are settled on a DVP basis on the books of Euroclear. On the settlement date, securities are transferred by book-entry from the securities account of the seller to the securities account of the buyer, provided that settlement conditions are met. Simultaneously, cash is transferred from the account of the buyer to the account of the seller. Securities and cash transfers between buyer and seller accounts are final and irrevocable upon settlement. Euroclear has relationships, with respect to cash, with cash correspondent banks in about 43 countries. They provide the link between Euroclear Bank and the national cash payment system(s) in the country of the currency.

Since November 2001, Euroclear Bank has also offered its participants the possibility to settle transactions in central bank money (CeBM) during the real-time process. Euroclear’s CeBM settlement service supports DVP settlement (Model 1), using securities deposited in the Euroclear System and cash deposited in the NBB. Settlement in CeBM is offered exclusively in euros. No credit facilities are offered on the CeBM cash account. Euroclear operates this account.

5.2.6 Cross-system settlement

“Bridge” settlements

Participants can receive securities from or deliver them to a Clearstream member over the electronic Bridge with Clearstream. The linkage with Clearstream allows transfer of international securities (ie eurobonds) and of domestic securities that are eligible in both systems. Transfers are either against payment or free of payment. The settlement timing is the same as for internal settlements within the Euroclear System. In Clearstream as in Euroclear, there are several overnight processings before each settlement date. After each Euroclear or Clearstream processing, there is an electronic transmission of files to the other system.

Receipts of securities from Clearstream are processed in the Euroclear overnight processing after receipt of Clearstream’s proposed deliveries to Euroclear participants. Euroclear is informed of these proposed deliveries after completion of the Clearstream processing before the relevant Euroclear processing. After each overnight processing, Euroclear informs Clearstream of the acceptance or refusal of each proposed delivery. The receipt becomes final and irrevocable when Clearstream receives the acceptance feedback from Euroclear. If a receipt from Clearstream is accepted, securities are credited and, if the receipt is against payment, cash is debited as a result of the overnight processing. If the receipt is refused, eg because the participant has insufficient cash available, the participant’s instruction to receive is included in the following overnight processings until settled or cancelled by the participant. After each overnight processing, Euroclear also informs Clearstream of proposed deliveries to Clearstream members which will be successfully or not included in the following Clearstream processing; a proposed delivery from Clearstream which fails to settle in the first Euroclear overnight processing may be proposed again by Clearstream for the second overnight processing.

Settlements with local market participants

To provide settlement of trades with local counterparties, links have been set up with a number of local CSDs. These links allow settlement of external transactions in a wide range of domestic securities, eg,

government debt, corporate debt, equities and equity-linked (such as warrants). Trades between a Euroclear participant and a counterparty in a domestic market are settled either directly or indirectly via an agent with domestic CSDs in more than 30 markets in Europe (eg Belgium, France, Germany, Italy, the Netherlands, Spain, Sweden), North and South America (eg Argentina, Canada, Mexico, the United States), Asia-Pacific (eg Australia, Hong Kong, Japan, Singapore) and Africa (Republic of South Africa).

Costs and risks involved in the settlement between Euroclear participants and local market participants are heavily influenced by local market practices. Trades settling via domestic market links settle on a DVP basis only if DVP is provided in the local market. In the same way, settlement in the Euroclear System becomes final and irrevocable in line with the rules of the domestic market. As a rule, Euroclear Bank credits securities to participants only if it has actually received the securities for the account of such participants. Availability of securities is only given after this receipt is final and therefore any risk of unwind of the receipt has been eliminated.

5.2.7 Custody function

The securities deposited by the participants in the Euroclear System are typically subdeposited with a network of more than 70 custodians (called depositories), who are banks, central banks or SSSs generally located in the country of issuance or liquidity of the security, covering 32 markets. Some of those custodians in turn may subdeposit the securities with their own subcustodians, typically SSSs. International securities (such as eurobonds) are typically subdeposited with banks that act as custodians for Euroclear Bank or as common depositories for Euroclear Bank and Clearstream Banking. These custodians may be authorised to subdeposit the securities as necessary, generally with their own offices or subsidiaries in other locations.

Securities deposited by participants in the Euroclear System are deposited with Euroclear Bank, as operator of the Euroclear System. Securities deposited in this way with Euroclear Bank may be subdeposited with various depositories throughout the world. All Euroclear securities held by a depository or subdepositories are credited to segregated custody accounts (in the name of Euroclear Bank) and labelled or otherwise appropriately identified as being held for Euroclear Bank as operator of the Euroclear System. For securities held in physical form in the vaults of the custodian, the Depositary Agreement also requires that the custodian segregates physically the securities held for Euroclear Bank from any security of the same issue that it would hold for its own account or for any other client.

Euroclear Bank also enters into a Depositary Agreement with each depository which, as a rule, confirms, among other things, that it has no ownership interest in securities it holds for Euroclear Bank and that such securities are freely transferable, except (in certain instances) for a limited right of retention for safekeeping fees charged by the depository.

Securities deposited in the Euroclear System may be in either physical, registered or in dematerialised form and are held on a fungible basis. Euroclear Bank offers a large number of custody services facilitating the exercise of securities holders' rights and corporate actions, including eg tax services, proxy voting, information on corporate events and processing for collection of income and redemption proceeds, market claims, and exercise of subscription rights.

5.2.8 Securities lending and borrowing

Euroclear Bank offers a securities lending and borrowing programme which is fully integrated into its overnight settlement process. As a general rule, all securities accepted by the Euroclear System are eligible for securities lending and borrowing except those bound by liquidity, fiscal or legal restrictions. Standard borrowings are allocated whenever a borrower has insufficient securities in its account to make a delivery, provided sufficient securities are available from lending. Borrowings are reimbursed on the first overnight settlement process where securities are available in the borrower's account. In the programme, all securities made available by lenders are aggregated in a lending pool. Securities are then distributed to borrowers and loans are allocated among lenders according to standard procedures. Through the intermediation of Euroclear Bank, a borrower's name is never revealed to the lender and vice versa. This Euroclear "screen" between borrowers and lenders ensures confidentiality of participants' positions. Euroclear Bank guarantees to each lender the return of lent securities or their cash equivalent in the case of borrower default as well as the payment of the lending fees.

Euroclear Bank also guarantees income and redemption proceeds and other entitlements on lent securities. The credit extended in the framework of this facility is fully collateralised.

5.2.9 Collateral management

Euroclear provides its participants with integrated collateral management services facilitating collateralisation of all types of exposures from a single pool of collateral. Collateral services offered in the Euroclear System include marking to market, substitutions, margin calls and other monitoring associated with collateralised securities. Integrated collateral management supports standard market agreements for repos, securities lending, derivatives support and secured loans. A service agreement documenting these services must be executed between the collateral giver, the collateral taker and Euroclear, acting as collateral management service agent. A specific triparty agreement is used for each collateral management product. Autoselect, the collateral management securities substitution and selection module, runs eight times a day during the real-time settlement process.

5.2.10 New issues

New issues of internationally traded securities, including many international equity distributions, are closed and distributed on a same-day against-payment basis. Approximately 75% of all primary distributions of securities issued in the euromarkets are facilitated through the Euroclear System. Distribution of securities either against payment or free of payment centralises control of allotment payments from participants to the lead manager. Assistance in connection with the administration of the exchange of global certificates for definitive certificates is also provided.

5.2.11 TradeGO

Euroclear offered a clearing service to the market through a fully owned subsidiary called TradeGO, whose role was to act as the Trade Guarantee Organisation (TGO), ie as central counterparty for cash transactions traded on COREDEAL, the electronic order-driven exchange for internationally traded debt instruments of the International Securities Market Association (ISMA). TradeGO has stopped its activities since November 2002.

5.3 Risk management

5.3.1 Settlement risk

Settlement risk refers to the risk of losing an asset (securities or cash) as a result of a delivery of such asset prior to the receipt of the appropriate countervalue from the counterparty.

Euroclear is a DVP1 settlement system that holds both cash and securities accounts on its books. Intraday finality for the batch processing or immediate finality for the real-time process is achieved through simultaneous book-entry on the respective cash and securities accounts which eliminates the settlement risk between the two parties to a trade and precludes the possibility of unwinding transactions in case one of the parties defaults.

Settlement of internal transactions (between two Euroclear participants on Euroclear's books or in central bank money) is final upon execution and generation of records (ie at the completion of each of the settlement processes). Therefore, the simultaneous transfer of securities of securities and transfer of cash are final at such time.

Settlement over the Bridge with Clearstream is also on a Model 1 DVP basis since there are simultaneous and final transfers of cash and securities accounts each holds with the other after each exchange. Transfers by Euroclear are final upon the receipt of an acceptance feedback from Clearstream (and vice versa for receipts by Euroclear over the Bridge).

External trades settling through domestic market links established by Euroclear effectively settle in the local market. They become final in accordance with the local market rules on finality. Euroclear will not, as a rule, credit a participant's account with cash or securities before receipt by Euroclear of the cash or securities in its local account with finality. Therefore Euroclear and its participants will not be subject to settlement risk.

5.3.2 Credit risk

Euroclear participants can arrange flexible credit facilities with Euroclear Bank to support the securities settlement process. Credit risk refers to the risk that Euroclear could experience a loss due to the failure of a counterparty to reimburse extended credit. In order to minimise this risk, Euroclear imposes credit limits and collateralisation requirements on the participants. The overwhelming majority of the credit facilities for Euroclear participants are fully secured.

Credit facilities granted to participants are uncommitted and are only intended for intraday cash borrowing and commitments in connection with local market settlement and for securities borrowing.

Euroclear grants credit to its participants on a temporary basis (operating exposure). The operating exposure in Euroclear can typically be characterised as a form of intraday credit usage, the duration of the operating exposure being generally less than 24 hours. It is only under unforeseen circumstances, primarily as a result of settlement failures, that part of the operating exposure may not get confirmed in time and, therefore, becomes a real end-of-day overdraft that is retained on the books of the bank.

5.3.3 Market and liquidity risk

Market risk refers to the risk that the value of Euroclear investments will fall, causing a deterioration of the bank's capital structure. Market risk arises because of market movements and price changes impacting the bank's investment securities.

Liquidity risk refers to the risk that Euroclear will not be able to meet its cash and payment obligations as they fall due. It results from the fact that cash flows in the bank's treasury operations do not match its liabilities to customers. Beside its usual liquidity supply sources like the interbank market or uncommitted credit facilities with business counterparties, Euroclear maintains a liquidity contingency plan on a permanent basis to provide extra sources of funds in case the normal supply is not sufficient. It should also be noted that Euroclear's investment activities are bound by strict rules designed to maintain the liquidity available.

5.3.4 Operational reliability

Euroclear operates a complex computer and telecommunications environment composed of various internally developed and third-party software application systems installed on both mainframe and distributed computing environments. Communication between participants and Euroclear may be by the Euroclear's proprietary EUCLID system or by the private SWIFT network. Both systems provide security and integrity over the instructions by requiring the customer to perform user identification and authentication procedures. Access to Euroclear services is simplified through standardised instructions and reports. Backup facilities are available. Disaster recovery and business continuity plans are in place in order to ensure the continuity of the services in the event of serious malfunctions at the production centre. The contingency infrastructure and procedures are subject to regular testing and maintenance. The business continuity plan is being reviewed to ensure harmonisation at Euroclear Group level and in the light of the conclusions drawn from the events of 11 September 2001.

6. Clearstream

6.1 Introduction: the corporate structure of Clearstream Banking Luxembourg SA

Cedel was founded on 28 September 1970 to provide for the clearing, settlement, custody and management of securities and precious metals.

On 1 January 1995, with the intention of increasing the company's effectiveness, Cedel became Cedel Bank (and later Cedelbank) in order to take advantage of capital adequacy regulations. At the same time, Cedel International was established as the parent company of the Cedel Group.

In May 1999, Cedel International and Deutsche Börse Clearing AG decided to merge. The two entities then formed Clearstream International, of which 50% is owned by Cedel International Holding (itself held by international financial institutions), the other 50% being held by the Deutsche Börse AG.

Clearstream International is the parent company of Clearstream Banking Luxembourg SA (CBL), Clearstream Banking Frankfurt AG (CBF) and Clearstream Services (located in Luxembourg). Clearstream International officially started operations in January 2000 and operates under Luxembourg law. CBF has taken over the business of the former Deutsche Börse Clearing and continues to operate under German law as a bank and as the German CSD, while CBL has taken over from Cedelbank and operates as the Luxembourg CSD.

The Boards of Directors, the management, the corporate functions, IT, and the sales and marketing functions have been integrated since January 2000, whereas the network management is still in the process of being integrated. The first key step was the migration of CBF's business in international securities onto the Creation platform (operated by CBL).

In July 2002, Deutsche Börse AG acquired Cedel's 50 % stake in Clearstream International.

Clearstream International is represented by offices in London, New York, Hong Kong, Dubai and São Paulo.

6.2 Present situation, prudential supervision and oversight

CBL is a duly licensed credit institution incorporated under Luxembourg law and is thus authorised to carry out the complete range of banking activities. However, CBL's by-laws stipulate that its core business consists in acting as a depository and providing clearing and settlement services in respect of the securities which have been or are to be deposited with CBL. Consequently, the other banking activities of CBL are limited to facilitating its settlement and clearing services.

As a licensed credit institution, CBL is subject to supervision by the "Commission de Supervision du Secteur Financier" (CSSF).

Following the transposition of the EC Settlement Finality Directive into Luxembourg law, the European Commission has been notified of the SSS status of CBL, which is thus covered by the Directive. As such, CBL is overseen by the Central Bank of Luxembourg.

6.3 Participants in the system

Membership is open essentially to banks, broker-dealers, investment banks, central banks and CSDs. New members have to meet certain criteria when applying for membership and their credit standings are assessed on an ongoing basis. Criteria against which membership is assessed include the institution's net worth, its legal structure, its management reputation and the underlying country risk. Today, CBL maintains customer relationships with all major financial institutions from over 100 countries.

6.4 Types of transaction handled

Over 230,000 securities are currently accepted by CBL for clearance and settlement. They include fixed income bonds such as eurobonds, foreign bonds, domestic bonds and convertibles, money market instruments (including short- and medium-term notes, commercial paper and certificates of deposit), as well as equities, depository receipts, units in investment funds, warrants and precious metals. CBL operates a multicurrency system, which currently covers 43 currencies.

6.5 Transaction processing environment

Communication media available to customers to send settlement instructions include the SWIFT network, the CBL communication system Cedcom, and telex.

Once an instruction is received by CBL, it is checked automatically against validation criteria, such as the International Securities Identification Number (ISIN), to ensure that the instruction was input correctly. After the validation, the instruction has to be matched with the instruction from the counterparty. It is then considered to be a valid settlement order. If the instruction is not validated, the customer is informed immediately so that the instruction can be rectified and a new instruction sent before processing deadlines.

Reports of settled and unsettled trades are available on an hourly basis throughout the day. Full reporting, including information on cash and securities balances and total holdings, is provided to customers after both the overnight processing and the daytime continuous settlement processing.

6.6 Settlement procedures

CBL has developed and implemented a book-entry IT system through which cash and securities are exchanged simultaneously. This DVP mechanism is intended to eliminate the principal risk. Where customers cannot deliver securities or cash at the designated time, CBL offers a comprehensive securities lending programme and provides cash lending facilities. These support mechanisms are closely monitored via dedicated cash and collateral management services.

6.6.1 Overnight and daytime processing

Transactions in CBL are processed during the CBL overnight processing and during the daytime continuous settlement processing. All valid instructions received by 7.45 pm (CET) are settled overnight for value the following day. Continuous settlement occurs on a same day basis and takes place during the day for all valid instructions received by 4 pm (CET). Transactions failing during the overnight processing can be reconsidered for settlement in the 10 subsequent continuous settlement processing cycles.

6.6.2 Bridge settlements

The original Bridge Agreement between CBL and Euroclear was concluded in 1993. Trades with counterparties in Euroclear are settled overnight via the electronic Bridge on a DVP or FOP basis. The Bridge allows transactions to be settled between customers of CBL and Euroclear by means of crediting or debiting the account held by each clearing and settlement system with each other. In November 2000, Clearstream International and Euroclear signed an agreement to supplement the existing overnight Bridge with a new daytime transaction processing feature between both systems. This daytime Bridge for multiple intraday exchanges of securities and cash deliveries operates manually for the time being. Complete automation is expected in 2004. The main benefits of this new procedure, namely increased efficiency, greater liquidity of customer transactions and the possibility of distributing new issues on a same day basis, will only be fully effective after the automation of the daytime bridge.

6.6.3 Internal transactions

Securities held in the CBL system and traded between CBL counterparties are settled in accordance with the counterparties' instructions on a DVP or FOP basis through the simultaneous book-entry transfer of securities and cash between the accounts of the buyer and the seller.

6.6.4 External transactions

Trades with counterparties on other domestic markets are settled through one of CBL's depositories, either a national CSD or a bank, depending on the market.

6.6.5 The Creation project

The Creation settlement system is a new central application enabling CBL to offer customers a rapid daytime settlement service. In addition to features such as eligibility checking, settlement and technical netting, provision checking and transaction booking, the new Creation system includes functions such as automatic reimbursement of securities lending, automatic substitution of collateral, automatic collateral top-up and return of specific collateral pledged, and settlement of securities financing.

Based on the principle of continuous intraday DVP settlement, the Creation IT platform improves liquidity for customers through technical netting facilities.

The Creation system is now used for the international securities business for both intraday and overnight processing.

Contrary to initial plans, CBF will continue to operate the Cascade system while Creation will be used for CBL and the international securities business of CBF.

6.7 Risk management

6.7.1 Default of a counterparty

From a legal point of view, the default of a participant in CBL does not have an impact on the property rights of its counterparties as regards securities transactions settled prior to the time of the court order. With regard to securities transferred to a counterparty under a pledge agreement, such collateral may, from the moment the debtor is in default, be used without written notice to meet any of its obligations. In the case of a repo agreement, the default of a participant does not adversely affect the property rights of the owner of the securities. Since settlement of transactions can only occur if the necessary cash and securities provisions are available, customers of CBL are not exposed to the risk of default by another customer.

6.7.2 Securities and cash lending facilities

CBL manages three different types of securities lending programmes: Automated Securities Lending (ASL), Disclosed Automated Securities Lending, and Strategic Securities Lending (SSL). The mechanisms are optional and are intended to avoid possible settlement failures by customers. In all these programmes, CBL never acts as principal, but merely as an intermediary between the lenders and the borrowers.

In addition, CBL offers two types of credit facilities against collateral: the Unconfirmed Funds Facility (UFF) and the Technical Overdraft Facility (TOF).

Unsecured credit lines are granted to top names in the financial sector only. Prior to opening unsecured credit lines, CBL analyses the customer's creditworthiness, which is reviewed and approved by the CBL Internal Credit Group. The case is then presented to and ratified by the CBL Executive Board. The use of such credit lines is monitored on a daily basis, with particular emphasis on identifying potential large exposures.

6.7.3 Responsibility of CBL

In the absence of negligence or wilful misconduct on its part, CBL is not liable to customers for any loss, claim, liability, expense or damage arising from any action taken or not taken by CBL. In addition, CBL has taken out insurance policies covering crime and depository indemnity up to USD 75 million and covering risks of physical loss or damage up to USD 500 million.

Glossary

List of terms and abbreviations

(January 2003)

Title	Short title	First published
Delivery versus payment in securities settlement systems	DVP	September 1992
Payment systems in the Group of Ten countries	Red Book	December 1993
Cross-border securities settlements	x-border	March 1995
Settlement risk in foreign exchange transactions	FX	March 1996
Payment systems in the European Union (Blue Book)	Blue Book	April 1996
Security of electronic money	EM-Sec	August 1996
Implications for central banks of the development of electronic money	EM-CPSS	October 1996
Disclosure framework for securities settlement systems	SDF	February 1997
Clearing arrangements for exchange-traded derivatives	ETDC	March 1997
Report on electronic money	EM-ECB	August 1998
Report on OTC derivatives: settlement procedures and counterparty risk management	OTC	September 1998
Securities lending transactions: market development and implications	SLT	July 1999
Payment systems in countries that have applied for membership of the European Union (Blue Book)	Blue Book	August 1999
Retail payments in selected countries: a comparative study	Retail	September 1999
Core principles for systemically important payment systems	Core Principles	January 2001
Recommendations for securities settlement systems	SSS	November 2001

A note on the source reports

The source column lists all the reports in which the term is defined. The following notational conventions are used:

- Source marked in **bold**: generally indicates the primary source of the definition, ie generally the report in which the term was defined for the first time.
- Source marked in *italics*: indicates that the listed explanation may be slightly different from the one used in the report without materially changing the meaning. In some cases the listed explanation elaborates or clarifies the definition further than that contained in the relevant report.

Term	Definition	Source
acceptance for settlement	the stage in the processing of a payment at which it has passed all risk management and other tests and can be settled under the system's rules and procedures.	Core Principles
acceptor	any trading or service establishment that accepts, on its own behalf or on behalf of its network, the payment of goods or services via an electronic money instrument.	EM-ECB
access	the right of or opportunity for an institution to use the services of a particular payment system to settle payments on its own account or for customers. See also direct participant, direct participant/member, indirect participant/member, participant/member.	Core Principles
access products	payment instruments that allow customers to access their deposit accounts and to transfer the deposits therein. Examples include electronic funds transfers at the point of sale and home banking facilities.	EM-ECB <i>EM-CPSS</i>
accountability	record-keeping of electronic money transactions.	EM-ECB
ACH	see automated clearing house.	
acquirer	the entity or entities that hold(s) deposit accounts for card acceptors (merchants) and to which the card acceptor transmits the data relating to the transaction. The acquirer is responsible for the collection of transaction information and settlement with the acceptors.	EM-ECB
acquiring technical operator	the party providing the technical facilities for each acquiring entity to accept the data relating to each transaction.	EM-ECB
advisory netting	see position netting.	Red Book Blue Book
agency relationship	a contractual relationship in which one party, the agent, acts on behalf of another party, the principal. The agent may execute trades for the principal but is not responsible for performance by the principal.	ETDC
agent	an entity, such as a fund manager or a custodian, that undertakes a securities loan and negotiates the terms with the borrower on behalf of a customer-owner.	SLT
APS	see assured payment system.	
arbitrage	profiting from a difference in price when the same security, currency or commodity is traded on two or more markets.	SLT
assured payment system	an arrangement in an exchange-for-value system under which completion of timely settlement of a payment instruction is supported by an irrevocable and unconditional commitment from a third party (typically a bank, syndicate of banks or clearing house). See also exchange-for-value settlement system.	DVP Red Book Blue Book
asymmetric cryptography	a set of cryptographic techniques in which two different keys (private and public keys) are used for encrypting and decrypting data. The private key is kept secret by its holder while the public key is made available to communicating entities. Also called public key cryptography.	EM-Sec
ATM	see automated teller machine.	

Term	Definition	Source
auditability	understood to mean that it is possible to establish whether a system is functioning properly and, thereafter, that it has worked properly. One aspect of auditability is to provide sufficient knowledge about the system and its structure, functions, controls, etc by means of appropriate documentation. Another important aspect of auditability is to make visible all integrity-related modifications to the system and its data. Logging data should make it possible to answer the questions “who?”, “what?” and “when?”.	EM-ECB
audit trail	a sequential record of events having occurred in a system.	EM-Sec
authentication	the methods used to verify the origin of a message or to verify the identity of a participant connected to a system and to confirm that a message has not been modified or replaced in transit.	EM-CPSS Core Principles
automated clearing house	an electronic clearing system in which payment orders are exchanged among financial institutions, primarily via magnetic media or telecommunications networks, and handled by a data processing centre. See also clearing/clearance.	Red Book Blue Book
automated teller machine	an electromechanical device that permits authorised users, typically using machine-readable plastic cards, to withdraw cash from their accounts and/or access other services, such as balance enquiries, transfer of funds or acceptance of deposits. ATMs may be operated either online with real-time access to an authorisation database or offline.	Red Book Blue Book <i>Retail</i>
availability	the ability of services and information to be accessed by users when requested.	EM-Sec
back office	the part of a firm that is responsible for post-trade activities. Depending upon the organisational structure of the firm, the back office can be a single department or multiple units (such as documentation, risk management, accounting or settlements). Some firms have combined a portion of these responsibilities usually found in the back office, particularly those related to risk management, into what they term a middle office function. See also front office.	OTC
back-to-back trades	a pair of transactions that requires a counterparty to receive and redeliver the same securities on the same day. The transactions involved may be outright purchases and sales or collateral transactions (repurchase agreements or securities loans). For example, a securities dealer might buy and sell the same securities for the same settlement date in the course of making markets for customers or it might buy securities for inventory and finance the position through a repurchase agreement.	x-border
back-to-back transactions	a chain of securities transactions among three or more counterparties involving the purchase and sale of a single security, for settlement on a single date. The most simple back-to-back trade is a pair of transactions in which one party agrees to purchase securities from a second party and then agrees to sell them to a third party.	Blue Book SLT

Term	Definition	Source
back-to-back transactions	a pair of transactions that requires a counterparty to receive and redeliver the same securities on the same day. The transactions involved may be outright purchases and sales or collateral transactions (repurchase agreements or securities loans). For example, a securities dealer might buy and sell the same securities for the same settlement date in the course of making markets for customers or it might buy securities for inventory and finance the position through a repurchase agreement.	SSS
balance-based system	an electronic money system in which the electronic funds are stored on a device as a numeric ledger, with transactions performed as debits or credits to a balance.	Blue Book EM-Sec
bank draft	in Europe, the term generally refers to a draft drawn by a bank on itself. The draft is purchased by the payer and sent to the payee, who presents it to his bank for payment. That bank presents it to the payer's bank for reimbursement. In the United States, the term generally refers to a draft or cheque drawn by a bank on itself or on funds deposited with another bank. In the case of a cashier's cheque, the bank is both the drawer and drawee. In the case of a teller's cheque, one bank is the drawer and a second bank is the drawee. Bank drafts may be written by a bank for its own purposes or may be purchased by a customer and sent to a payee to discharge an obligation. See also draft.	Red Book
bank reserves	deposits held by banks with the central bank.	EM-CPSS
basis risk	the risk of changes in the basis, that is, the difference between the price of a futures or forward contract and the price of the underlying asset.	ETDC
batch	the transmission or processing of a group of payment orders and/or securities transfer instructions as a set at discrete intervals of time.	Red Book Blue Book Retail
beneficial ownership/ interest	the entitlement to receive some or all of the benefits of ownership of a security or other financial instrument (eg income, voting rights, power to transfer). Beneficial ownership is usually distinguished from "legal ownership" of a security or financial instrument. See also legal ownership.	DVP Red Book Blue Book SLT
bilateral credit limit	see credit limit.	Core Principles
bilateral exposure	one party's exposure to another party.	Core Principles
bilateral net settlement system	a settlement system in which participants' bilateral net settlement positions are settled between every bilateral combination of participants. See also net credit (or debit) position.	Red Book Blue Book
bilateral netting	an arrangement between two parties to net their bilateral obligations. The obligations covered by the arrangement may arise from financial contracts, transfers or both. See also multilateral netting, netting, net settlement.	DVP Red Book Blue Book
bill of exchange	a written order from one party (the drawer) to another (the drawee) to pay a specified sum on demand or on a specified date to the drawer or to a third party specified by the drawer. Widely used to finance trade and, when discounted with a financial institution, to obtain credit. See also draft.	Red Book Blue Book

Term	Definition	Source
biometric	refers to a method of identifying the holder of a device by measuring a unique physical characteristic of the holder, eg by fingerprint matching, voice recognition or retinal scan.	EM-Sec
bit	the basic data element: a binary digit, either 0 or 1.	EM-Sec
book-entry system	an accounting system that permits the transfer of claims (eg electronic transfer of securities) without the physical movement of paper documents or certificates. See also dematerialisation, immobilisation.	Red Book Blue Book <i>DVP</i> <i>x-border</i> <i>SLT</i>
bridge	the "bridge" is the name commonly used for the link between Euroclear and Clearstream that permits cross-system settlement of a trade between a participant in one ICSD (international central securities depository) and a participant in the other ICSD.	x-border
broker	a firm that communicates bid and ask levels to potential principals and otherwise arranges transactions as agent for a fee, without acting as counterparty in the transactions.	OTC
broker-dealer	a person or firm sometimes acting as broker and sometimes as principal intermediary in securities transactions. A broker is a firm that communicates bid and ask levels to potential principals and otherwise arranges transactions as agent for a fee, without acting as counterparty in the transactions.	SLT
brute force attack	a method of cryptanalysis in which every possible cryptographic key is tried.	EM-Sec
bulk funds transfer system	see retail funds transfer system.	Red Book Blue Book
business continuity	a payment system's arrangements which aim to ensure that it meets agreed service levels even if one or more components of the system fail or if it is affected by an abnormal external event. Include both preventative measures and arrangements to deal with contingencies.	Core Principles
buy-in	a purchase of securities in the open market by the lender, where the borrower is not able to deliver the securities to the lender in accordance with the terms of the transaction (eg on the settlement date). All costs are borne by the borrower in this case.	SLT
byte	a series of eight bits.	EM-Sec
call money	a loan contract which is automatically renewed every day unless the lender or the borrower indicates that it wishes the funds to be returned within a short period of time.	Red Book Blue Book
capital risk	see principal risk.	Red Book Blue Book
caps	quantitative limits on the funds transfer activity of individual participants in a system; limits may be set by each individual participant or may be imposed by the body managing the system; limits can be placed on the net debit position or net credit position of participants in the system.	DVP
card	see cash card, cheque guarantee card, chip card, credit card, debit card, delayed debit card, prepaid card, retailer card, travel and entertainment card.	Red Book Blue Book Retail

Term	Definition	Source
card-based products	electronic money products which provide the customer with a portable, specialised computer device, typically an IC card containing a microprocessor chip.	EM-ECB
case law	precedents established in previously decided court cases that may influence future interpretations of law or the disposition of future court cases.	Core Principles
cash card	card for use only in ATMs or cash dispensers (other cards often have a cash function that permits the holder to withdraw cash).	Red Book Blue Book Retail
cash clearing	a method for clearing futures contracts in which positions are periodically marked to market and resulting obligations are satisfied by cash payments, known as variation margin. See also non-cash clearing and variation margin.	ETDC
cash correspondents	banks (or similar institutions) used by the SSS to make or receive payments.	SDF
cash deposit risk	the credit risk associated with the holding of cash balances with an intermediary for the purpose of settling securities transactions.	x-border <i>SLT</i>
cash dispenser	electromechanical device that permits consumers, typically using machine-readable plastic cards, to withdraw banknotes (currency) and, in some cases, coins. See also automated teller machine.	Red Book Blue Book Retail
cash-driven securities lending transactions	transactions motivated by the wish to borrow/invest a cash amount through a repo (or loan) of securities.	SLT
cashier's cheque	see bank draft.	Red Book Blue Book
cash memorandum accounts	records kept by the SSS of the funds due to be paid to or received by participants in conjunction with their securities settlements; the records are for information purposes only and do not represent legal claims or liabilities between the SSS and its participants.	SDF
cash settlement agent	the entity whose assets are used to settle the ultimate payment obligations arising from securities transfers within the CSD. Accounts with the cash settlement agent are held by settlement banks which act on their own behalf and may also offer payment services to participants that do not have accounts with the settlement agent. See also settlement agent.	SSS
central bank bills	short-term securities issued by the central bank which could be marketable or tradable.	EM-CPSS
central bank credit (liquidity) facility	a standing credit facility that can be drawn upon by certain designated account holders (eg banks) at the central bank. In some cases, the facility can be used automatically at the initiative of the account holder, while in other cases the central bank may retain some degree of discretion. The loans typically take the form either of advances or overdrafts on an account holder's current account which may be secured by a pledge of securities (also known as lombard loans in some European countries), or of traditional rediscounting of bills.	Red Book Blue Book <i>DVP</i>
central counterparty	an entity that is the buyer to every seller and seller to every buyer of a specified set of contracts, eg those executed on a particular exchange or exchanges.	ETDC SSS

Term	Definition	Source
central processing unit	area of a computer system (and of an IC card) that performs computations.	EM-Sec
central securities depository	a facility (or an institution) for holding securities, which enables securities transactions to be processed by book entry. Physical securities may be immobilised by the depository or securities may be dematerialised (ie so that they exist only as electronic records). In addition to safekeeping, a central securities depository may incorporate comparison, clearing and settlement functions.	Red Book <i>Blue Book</i> <i>DVP</i> <i>x-border</i> <i>SLT</i>
certificate	physical document which evidences an ownership claim in, indebtedness of, or other outstanding financial obligations of the issuer.	Red Book
certificate	the piece of paper which evidences the undertakings of an issuer of a security or financial instrument.	DVP
certification authority	an entity entrusted with creating and assigning public key certificates.	EM-Sec
CFD	see contract for difference.	
chaining	a method used in certain transfer systems (mostly for securities) for processing instructions. It involves the manipulation of the sequence in which transfer instructions are processed to increase the number or value of transfers that may be settled with available funds and/or securities balances (or available credit or securities lending lines).	DVP <i>Red Book</i> <i>Blue Book</i>
challenge-response	a means of authentication in which one device replies in a predetermined way to a challenge from another device, thus proving its authenticity.	EM-Sec
charge card	see travel and entertainment card.	Retail
cheque	a written order from one party (the drawer) to another (the drawee, normally a bank) requiring the drawee to pay a specified sum on demand to the drawer or to a third party specified by the drawer. Cheques may be used for settling debts and withdrawing money from banks. See also bill of exchange.	Red Book <i>Blue Book</i> <i>EM-CPSS</i> <i>Retail</i>
cheque guarantee card	a card issued as part of a cheque guarantee system. This function may be combined with other functions in the same card, eg those of a cash card or debit card. See also cheque guarantee system.	Red Book <i>Blue Book</i> <i>Retail</i>
cheque guarantee system	a system to guarantee cheques, typically up to a specified amount, that have been validated by the merchant either on the basis of a card issued to the cheque writer or through a central database accessible to merchants. Validated cheques are guaranteed by the issuer of the guarantee card, the drawee bank or the system operator.	Red Book <i>Blue Book</i> <i>Retail</i>
chip card	also known as an IC (integrated circuit) card. A card containing one or more computer chips or integrated circuits for identification, data storage or special purpose processing used to validate personal identification numbers (PINs), authorise purchases, verify account balances and store personal records. In some cases, the memory in the card is updated every time the card is used (eg an account balance is updated).	Red Book <i>Blue Book</i> <i>EM-CPSS</i> <i>Retail</i>
choice of law	the determination of which law most appropriately governs the relationship between parties involved in the settlement of a securities transaction.	EM-Sec

Term	Definition	Source
choice of law	a contractual provision by which parties choose the law that will govern their contract or relationship. Choice of law may also refer to the question of what law should govern in the case of a conflict of laws. See also conflict of laws.	SSS
ciphertext	the encrypted form of data.	EM-Sec
clearance	the term “clearance” has two meanings in the securities markets. It may mean the process of calculating the mutual obligations of market participants, usually on a net basis, for the exchange of securities and money. It may also signify the process of transferring securities on the settlement date, and in this sense the term “clearing system” is sometimes used to refer to securities settlement systems.	SSS DVP SLT
clearing and settling institution	an institution which transmits information and funds through a payment system network. It may operate as an agent or a principal.	EM-ECB
clearing/clearance	the process of transmitting, reconciling and, in some cases, confirming payment orders or security transfer instructions prior to settlement, possibly including the netting of instructions and the establishment of final positions for settlement. Sometimes the term is used (imprecisely) to include settlement.	Red Book Blue Book EM-ECB
clearing house	a central location or central processing mechanism through which financial institutions agree to exchange payment instructions or other financial obligations (eg securities). The institutions settle for items exchanged at a designated time based on the rules and procedures of the clearing house. In some cases, the clearing house may assume significant counterparty, financial or risk management responsibilities for the clearing system. See also clearing/clearance, clearing system.	Red Book Blue Book EM-CPSS
clearing house funds	term most commonly used in certain US markets to refer to funds that typically are provisional on the day of receipt and final on the following day. More specifically, the term is used to refer to monetary claims with next day finality that are exchanged by participants in certain clearing house arrangements in settlement of obligations arising from the clearing process. Such claims are typically transferred via cheques, drafts or other similar payment.	Red Book
clearing link	an arrangement in which the same contract is traded on exchanges affiliated with two clearing houses but all positions are transferred daily to a single clearing house where they are carried until expiration or offset. See also mutual offset system.	ETDC
clearing member	a member of a clearing house. All trades must be settled through a clearing member. A direct clearing member is able to settle only its own obligations. A general clearing member is able to settle its own obligations as well as those of clients. Variations of these two types of clearing member may also exist.	ETDC
clearing system	a set of procedures whereby financial institutions present and exchange data and/or documents relating to funds or securities transfers to other financial institutions at a single location (clearing house). The procedures often also include a mechanism for the calculation of participants’ bilateral and/or multilateral net positions with a view to facilitating the settlement of their obligations on a net or net net basis. See also netting.	Red Book Blue Book EM-CPSS

Term	Definition	Source
client	a party that is not a member of the clearing house and must settle through a clearing member. Also known as customer.	ETDC
closed network	telecommunications network used for a specific purpose, such as a payment system, and to which access is restricted.	Retail
closeout	the process of offsetting existing contracts. Closeout may be used by the clearing house to prevent further losses from positions carried by an entity that has defaulted.	ETDC
closeout netting	a special form of netting which occurs following some predefined events such as default. Closeout netting is intended to reduce exposures on open contracts if one party meets certain conditions specified by the contract (eg becomes subject to insolvency procedures) before the settlement date (also referred to as default netting, open contract netting or replacement contract netting).	Blue Book
closing (or back) leg	second leg of a pair of transactions in the same securities, ie a securities lending transaction - one for a near value date, the other for a value date further into the future. See also opening (or front) leg.	SLT
collateral	an asset that is delivered by the collateral provider to secure an obligation to the collateral taker. Collateral arrangements may take different legal forms; collateral may be obtained using the method of title transfer or pledge.	OTC
collateral	an asset or third-party commitment that is accepted by the collateral taker to secure an obligation of the collateral provider vis-à-vis the collateral taker.	SSS
collateral management service	a centralised service that may handle any of a variety of collateral-related functions for a client firm, including valuation of collateral, confirmation of valuations with counterparties, optimisation of collateral usage and transfer of collateral.	OTC
collateral pool	assets owned by members of a payment system that are collectively available to the system as collateral to enable it to obtain funds in circumstances specified in its rules.	Core Principles
combination of an outright sale with put and call option	a derivative financial arrangement that has a similar economic effect to a securities lending transaction. In this arrangement, a dealer simultaneously (1) sells shares outright to a cash investor, receiving market value, (2) purchases OTC at-the-money call options from the cash investor giving the dealer the right to buy the shares at a specified date at the original price, and (3) sells to the cash investor OTC at-the-money put options that give the cash investor the right to sell the shares at the original price. This results in the dealer having a synthetic long position of the shares, retaining any positive or negative return on the shares, while the cash investor is hedged against a loss on the value of the shares, but must also pay away any gain to the dealer. The options are cash-settled at expiration. An option pricing model will produce premiums for the put and the call which net out to a predetermined financing cost.	SLT
committed facilities	facilities (for example, lines of credit or repo facilities) under which the provider is contractually committed to advance funds in defined circumstances. See also repurchase agreement.	Core Principles
comparison	see matching.	Red Book

Term	Definition	Source
confidentiality	the quality of being protected against unauthorised disclosure.	EM-Sec EM-ECB
confirmation	a particular connotation of this widely used term is the process whereby a market participant notifies its counterparties or customers of the details of a trade and, typically, allows them time to affirm or to question the trade.	Red Book Blue Book
confirmation	the process in which the terms of a trade are verified either by market participants directly or by some central entity (typically the market place). When direct participants execute trades on behalf of indirect market participants, trade confirmation occurs on two separate tracks: verification (generally termed confirmation) of the terms of the trade between direct participants and verification (sometimes termed affirmation) of the intended terms between each direct participant and the indirect participant for whom the direct participant is acting.	SSS
confirmation process	the procedure for verifying trade details with a counterparty. This is generally done by exchanging via fax or mail a document (ie a confirmation) identifying the trade details and any governing legal documentation and verifying the accuracy of the information provided by the counterparty (ie matching).	OTC SLT
conflict of laws	a situation in which two or more sets of laws that appropriately apply to a particular transaction require different results.	x-border
conflict of laws	an inconsistency or difference in the laws of jurisdictions that have a potential interest in a transaction. Each jurisdiction's conflict of laws rules specify the criteria that determine the law applicable in such a case.	SSS
contact cards	cards that require physical contact through an electronic connection surface between the card and the card reader or terminal device.	EM-Sec
contactless cards	cards that do not require physical contact between the card and the card reader or terminal.	EM-Sec
contract for difference	a financial contract in which the difference between the agreed fixed price of an asset and its prevailing market price is periodically credited to the counterparty in the money. Since there is no transfer of principal, a CFD covers hedging or speculative needs.	SLT
contract law	body of law concerned with making and enforcing arrangements.	Core Principles
contractual income collection	a contractual commitment by a custodian to credit a customer's cash account with interest, dividend or tax refund payments on the date on which the payments are scheduled, regardless of whether the custodian has actually received the payment. Usually such credits are provisional and are reversed if the custodian does not receive the payment within an interval established by the custodian.	x-border

Term	Definition	Source
contractual settlement date accounting	a contractual commitment by a custodian to credit and debit a customer's cash and securities accounts, as appropriate, on the date on which the customer's contract with its counterparty provides for settlement (the contractual settlement date), regardless of whether settlement has actually occurred. Usually these credits and debits are provisional and are reversed if settlement does not occur within an interval established by the custodian.	x-border
correspondent banking	an arrangement under which one bank (correspondent) holds deposits owned by other banks (respondents) and provides payment and other services to those respondent banks. Such arrangements may also be known as agency relationships in some domestic contexts. In international banking, balances held for a foreign respondent bank may be used to settle foreign exchange transactions. Reciprocal correspondent banking relationships may involve the use of so-called nostro and vostro accounts to settle foreign exchange transactions.	Red Book Retail
counterparty	the opposite party to a financial transaction such as a securities trade or swap agreement.	Red Book Blue Book Retail
counterparty credit limits	limits set by a trading party to restrict the largest amount of its credit exposures to different counterparties.	SLT
CPU	see central processing unit.	
credit caps	see caps.	Red Book Blue Book
credit card	a card indicating that the holder has been granted a line of credit. It enables the holder to make purchases and/or withdraw cash up to a prearranged ceiling; the credit granted can be settled in full by the end of a specified period or can be settled in part, with the balance taken as extended credit. Interest is charged on the amount of any extended credit and the holder is sometimes charged an annual fee.	Red Book Blue Book EM-CPSS Retail
credit card company	a company which owns the trademark of a particular credit card, and may also provide a number of marketing, processing or other services to its members using the card services.	Red Book Blue Book Retail
credit institution	the definition given to a "bank" in the European Union. The First EC Banking Directive defines it as an undertaking whose business is to receive deposits or other repayable funds from the public and to grant credits for its own account.	EM-CPSS EM-ECB
credit limit	limit on the credit exposure a payment system participant incurs vis-à-vis another participant (bilateral credit limit) or vis-à-vis all other participants (multilateral credit limit) as a result of receiving payments that have not yet been settled.	Core Principles
credit risk/exposure	the risk that a counterparty will not settle an obligation for full value, either when due or at any time thereafter. In exchange-for-value systems, the risk is generally defined to include replacement cost risk and principal risk.	DVP Blue Book

Term	Definition	Source
credit transfer	a payment order or possibly a sequence of payment orders made for the purpose of placing funds at the disposal of the beneficiary. Both the payment instructions and the funds described therein move from the bank of the payer/originator to the bank of the beneficiary, possibly via several other banks as intermediaries and/or more than one credit transfer system.	Red Book Blue Book EM-CPSS EM-ECB Retail
credit transfer system	a funds transfer system through which payment orders move from (the bank of) the originator of the transfer message or payer to (the bank of) the receiver of the message or beneficiary.	DVP <i>Red Book</i>
cross-border netting scheme	an arrangement to net positions or obligations between or among parties in more than one country or jurisdiction. See also netting.	Core Principles
cross-border settlement	a settlement that takes place in a country other than the country in which one trade counterparty or both are located.	x-border SDF
cross-border trade	a trade between counterparties located in different countries.	x-border
cross-border trade	a trade that requires cross-border settlement.	SSS
cross-currency settlement risk	see principal risk.	Red Book
cross-margining agreement	an agreement between central counterparties to consider positions and supporting collateral at their respective organisations as a portfolio for participants that are members of both organisations. Positions held in cross-margined accounts are subject to lower collateral requirements because the positions held at one central counterparty collateralise part of the exposure of related positions at the other central counterparty. In the event of a default by a participant whose account is cross-margined, one central counterparty can use the positions and collateral in the cross-margined account at the other central counterparty to cover losses.	SSS
cross-system settlement	a settlement of a trade that is effected through a link between two separate securities transfer systems.	x-border SSS
cryptanalysis	area of cryptography dedicated to studying and developing methods by which, without prior knowledge of the cryptographic key, plaintext may be deduced from ciphertext.	EM-Sec
cryptographic algorithm	a mathematical function used in combination with a key that is applied to data to ensure confidentiality, data integrity and/or authentication. Also called cipher.	EM-Sec
cryptography	the application of mathematical theory to develop techniques and algorithms that can be applied to data to ensure goals such as confidentiality, data integrity and/or authentication.	EM-Sec EM-CPSS EM-ECB
CSD	see central securities depository.	
CSDA	see contractual settlement date accounting.	
current exposure	the loss that would be incurred today on a contract or set of contracts if a counterparty failed to perform on its obligations. Also known as replacement cost, current exposure is what it would cost to replace a given contract if the counterparty defaulted now. See also potential future exposure.	OTC

Term	Definition	Source
custodian	an entity, often a bank, that safekeeps and administers securities for its customers and that may provide various other services, including clearance and settlement, cash management, foreign exchange and securities lending.	x-border SDF SLT
custody	the safekeeping and administration of securities and financial instruments on behalf of others.	DVP Red Book x-border Blue Book
custody-only link	a link between two Securities Settlement Systems (SSSs) which enables transactions in securities held in SSS1 to be settled using SSS2 (rather than SSS1) when the buyer and seller are both participants in SSS2. Custody-only links do not provide for the transfer of funds between SSS1 and SSS2 and cannot be used to settle transactions between a participant in SSS1 and a participant in SSS2.	SDF
custody risk	the risk of loss of securities held in custody occasioned by the insolvency, negligence or fraudulent action of the custodian or of a subcustodian.	x-border ETDC OTC SLT SSS
customer	a buyer, seller or holder of securities and financial instruments that does not participate directly in a system. A participant's holdings in a system often include securities and financial instruments of which the participant's customers are the beneficial owners.	DVP SDF
customer-to-customer transfer	see transferability.	EM-ECB
daily processing	complete cycle of processing tasks that need to be completed in a typical business day, from start-of-day procedures to end-of-day procedures including backing-up of data.	Core Principles
daily settlement	completion of settlement on the day of value of all payments accepted for settlement.	Core Principles
data encryption standard	a symmetric cryptographic algorithm (ANSI standard) that is widely used, in particular in the financial industry. Triple DES consists of operating three times on a set of data (encrypting-decrypting-encrypting) using a double-length DES key.	EM-Sec
daylight credit	credit extended for a period of less than one business day; in a credit transfer system with end-of-day final settlement, daylight credit is tacitly extended by a receiving institution if it accepts and acts on a payment order even though it will not receive final funds until the end of the business day. Also called daylight overdraft, daylight exposure and intraday credit.	DVP Red Book Blue Book SDF
day of value	day on which a payment is due to be credited to the receiving participant in the payment system. The day of value for the receiving participant's customer (that is, the day on which the receiving participant credits the customer in its books) may or may not be the same day, depending on specific arrangements or local practice.	Core Principles
DBV	see delivery by value.	

Term	Definition	Source
dealer	a firm that enters into transactions as a counterparty on both sides of the market in one or more products. OTC derivatives dealers are primarily large international financial institutions - mostly commercial banks but also some securities firms and insurance companies - as well as a few affiliates of what are primarily non-financial firms. See also end user.	OTC
debit balance	see net credit (or debit) position.	SDF
debit caps	see caps.	Red Book Blue Book
debit card	card enabling the holder to have his purchases directly charged to funds on his account at a deposit-taking institution (may sometimes be combined with another function, eg that of a cash card or cheque guarantee card).	Red Book Blue Book <i>EM-CPSS</i> Retail
debit transfer system	a funds transfer system in which debit collection orders made or authorised by the payer move from (the bank of) the payee to (the bank of) the payer and result in a charge (debit) to the account of the payer; for example, cheque-based systems are typical debit transfer systems. Also called debit collection system.	DVP Red Book Blue Book SLT
debt book-entry system	a computerised system for the issue and registration of debt securities in book-entry form. See also book-entry system, share book-entry system.	Blue Book
default	failure to complete a funds or securities transfer according to its terms for reasons that are not technical or temporary, usually as a result of bankruptcy. Default is usually distinguished from a "failed transaction".	Red Book Blue Book SDF SLT
defaulter pays	a loss-sharing arrangement where each participant is required to collateralise any exposures it creates for other participants. As a result, losses from a party's default are borne by the defaulting party.	Core Principles
deferred net settlement system	a system that effects the settlement of obligations or transfers between or among counterparties on a net basis at some later time.	ETDC
delayed debit card	card issued by banks indicating that the holder may charge his account up to an authorised limit. It enables him to make purchases but does not offer extended credit, the full amount of the debt incurred having to be settled at the end of a specified period. The holder is usually charged an annual fee.	Red Book Blue Book
deletion	a mechanism whereby some or all transfers to/from a defaulting participant are excluded from the settlement process. In a netting scheme, other participants' bilateral and/or multilateral net positions are recalculated. See also unwinding.	Red Book Blue Book
delivery	final transfer of a security or financial instrument.	DVP Red Book x-border Blue Book SDF

Term	Definition	Source
delivery by value	a mechanism in some settlement systems to assist a participant to borrow money from or lend money to another participant against collateral held in the system. The system will select and deliver securities (based on the preset specifications of the giver and the taker) to the appropriate party and arrange that equivalent securities be returned the following business day.	SLT
delivery versus delivery	a link between two securities transfer (settlement) systems that ensures that a delivery occurs if, and only if, another delivery occurs and vice versa.	SLT
delivery versus payment	a link between a securities transfer system and a funds transfer system that ensures that delivery occurs if, and only if, payment occurs.	DVP x-border SDF ETDC
delivery-versus-payment system	a mechanism in an exchange-for-value settlement system that ensures that the final transfer of one asset occurs if and only if the final transfer of (an)other asset(s) occurs. Assets could include monetary assets (such as foreign exchange), securities or other financial instruments. See also exchange-for-value settlement system, final transfer.	Red Book Blue Book
dematerialisation	the elimination of physical certificates or documents of title which represent ownership of securities so that securities exist only as accounting records.	DVP Red Book Blue Book SDF
depository	an agent with the primary role of recording securities either physically or electronically and keeping records of the ownership of these securities.	Blue Book
depository institution	the definition given to a "bank" in the United States. Under the Depository Deregulation and Monetary Control Act, all depository institutions, including commercial banks, savings and loan associations, mutual savings banks and credit unions, are authorised to issue demand or time deposits to individuals and non-profit organisations.	EM-CPSS
depository receipt	an instrument issued in one country that establishes an entitlement to a security held in custody in another country.	x-border SDF
derivative	a financial contract the value of which depends on the value of one or more underlying reference assets, rates or indices. For analytical purposes, all derivatives contracts can be divided into basic building blocks of forward contracts, options or combinations thereof.	OTC
derived key	a cryptographic key that is obtained by using an arithmetic function in combination with a master key and a unique identification value such as a card serial number.	EM-Sec
DES	see data encryption standard.	
digital signature	a string of data generated by a cryptographic method that is attached to a message to ensure its authenticity as well as to protect the recipient against repudiation by the sender.	EM-Sec
direct debit	preauthorised debit on the payer's bank account initiated by the payee.	Red Book Blue Book

Term	Definition	Source
direct holding system	a holding system for securities in which the beneficial owner of securities (i) is reflected as the legal owner on the issuer's official register(s) (and, if the securities are required to be certificated, the securities are issued in the name of the owner) or (ii) is in possession of securities issued to bearer. The issuer, CSD, participants in the CSD, and third-party claimants are required to recognise the owner's rights and interests in the securities based on the record of the register or the owner's possession of the security.	SSS
direct market participant	a broker-dealer or member of an exchange that directly executes an order.	SSS
direct participant	a participant in an interbank funds transfer system (IFTS) who is responsible to the settlement agent (or to all other direct participants) for the settlement of its own payments, those of its customers and those of the indirect participants on whose behalf it is settling.	Blue Book
direct participant/member	the term generally denotes participants in a funds or securities transfer system that directly exchange transfer orders with other participants in the system. In some systems, direct participants also exchange orders on behalf of indirect participants. Depending on the system, direct participants may or may not also be settling participants. In the EC context, this term has a specific meaning: it refers to participants in a transfer system which are responsible to the settlement institution (or to all other participants) for the settlement of their own payments, those of their customers and those of indirect participants on whose behalf they are settling. See also indirect participant/member, participant/member, settling participant/member.	Red Book
discharge	release from a legal obligation imposed by contract or law.	DVP Red Book Blue Book
disclosure	see public disclosure.	Core Principles
distributing institution	an institution which distributes (as an agent) or sells (as the issuer or an underwriter) the electronic money to the customer.	EM-ECB
domestic settlement	a settlement that takes place in the country in which both counterparties to the trade are located.	x-border SDF
domestic trade	a trade between counterparties located in the same country.	x-border SDF
draft	a written order from one party (the drawer) to another (the drawee) to pay a party identified on the order (payee) or to the bearer a specified sum, either on demand (sight draft) or on a specified date (time draft). See also bank draft, bill of exchange, cheque.	Red Book Blue Book
DVD	see delivery versus delivery.	

Term	Definition	Source
DVP schemes as defined by the G10	in model 1, transfer instructions for both securities and funds are settled on a trade by trade basis, with final transfer of the securities from the seller to the buyer (delivery) occurring at the same time as final transfer of the funds from the buyer to the seller (payment). In model 2, securities transfer instructions are settled on a gross basis, with final transfer of securities from the seller to the buyer (delivery) occurring throughout the processing cycle, but funds transfer instructions are settled on a net basis, with final transfer of funds from the buyer to the seller (payment) occurring at the end of the processing cycle. In model 3, transfer instructions for both securities and funds are settled on a net basis, with final transfers of both securities and funds occurring at the end of the processing cycle.	Blue Book
early termination option	a contract provision granting either counterparty the option to terminate a contract before its maturity date, sometimes upon payment of a fee.	OTC
EDI	see electronic data interchange.	
EEPROM	electronically erasable programmable read-only memory: the area of an IC chip used to store data. Data in EEPROM can be electronically erased and rewritten under the control of the operating system.	EM-Sec
EFTPOS	see point of sale.	Red Book Blue Book
electronic data interchange	the electronic exchange between commercial entities (in some cases also public administrations), in a standard format, of data relating to a number of message categories, such as orders, invoices, customs documents, remittance advices and payments. EDI messages are sent through public data transmission networks or banking system channels. Any movement of funds initiated by EDI is reflected in payment instructions flowing through the banking system. EDIFACT, a United Nations body, has established standards for electronic data interchange.	Red Book Blue Book Retail
electronic money	value stored electronically in a device such as a chip card or a hard drive in a personal computer.	Retail
electronic purse	a reloadable multipurpose prepaid card which may be used for small retail or other payments instead of coins. See also multipurpose prepaid card.	Blue Book EM-CPSS EM-ECB
electronic wallet	a computer device used in some electronic money systems which can contain an IC card or in which IC cards can be inserted and which may perform more functions than an IC card.	EM-Sec
embedding	in IC card manufacturing, the process by which the chip module is mounted on the plastic carrier (card).	EM-Sec
encryption	the use of cryptographic algorithms to encode clear text data (plaintext) into ciphertext to prevent unauthorised observation.	EM-Sec EM-CPSS EM-ECB
end-of-day gross settlement systems	funds transfer systems in which payment orders are received one by one by the settlement agent during the business day, but in which final settlement takes place at the end of the day on a one by one or aggregate gross basis. This definition also applies to gross settlement systems in which payments are settled in real time but remain revocable until the end of the day.	Blue Book

Term	Definition	Source
endogenous default	a default by a clearing member that results in losses on house or client positions carried by the clearing member at that clearing house rather than from losses from some other (exogenous) source	ETDC
end user	an entity that takes derivatives positions for investment or hedging purposes. An end user often deals only on one side of the market. End users include banks, insurance companies, pension funds, other financial institutions, non-financial corporations, governments, supranational entities (for example the World Bank) and high net worth individuals. See also dealer.	OTC
EPROM	electronically programmable read-only memory: the area of an IC chip used to store data. Data in EPROM can only be written once and cannot be erased selectively.	EM-Sec
equity swap	a swap which involves an exchange of return on a recognised stock index or a specified basket of individual stocks for a fixed or floating rate of interest.	OTC SLT
event of default	an event stipulated in an agreement as constituting a default. Generally, the occurrence of a failure to pay or deliver on the due date, breach of agreement and insolvency are events of default.	OTC SLT
exchange-for-value settlement system	system which involves the exchange of assets, such as money, foreign exchange, securities or other financial instruments, in order to discharge settlement obligations. These systems may use one or more funds transfer systems in order to satisfy the payment obligations that are generated. The links between the exchange of assets and the payment system(s) may be manual or electronic. See also delivery-versus-payment system.	Red Book Blue Book
exchange member	a member of an exchange with certain trading privileges. An exchange member may not necessarily be a member of the exchange's clearing house.	ETDC
exchange-traded derivative	a derivative which is listed and traded at an organised marketplace. Derivatives exchanges generally provide standardised contracts and central clearing facilities for participants.	OTC
exit criteria	criteria for an existing participant in a payment system to cease to participate.	Core Principles
face-to-face payment	payment carried out by the exchange of instruments between the payer and the payee in the same physical location.	Red Book Blue Book EM-CPSS EM-ECB Retail
fail	a failure to settle a securities transaction on the contractual settlement date, usually because of technical or temporary difficulties. Fail is usually distinguished from "default". Also called failed transaction.	SLT
failed transaction	a securities transaction in which the securities and cash are not exchanged as agreed on the settlement date, usually because of technical or temporary causes.	DVP SDF
failed transaction	a securities transaction that does not settle on the contractual settlement date.	SSS
final (finality)	irrevocable and unconditional.	Red Book Blue Book

Term	Definition	Source
finality risk	the risk that a provisional transfer of funds or securities will be rescinded.	SDF
final settlement	settlement which is irrevocable and unconditional.	Red Book Blue Book
final settlement	the discharge of an obligation by a transfer of funds and a transfer of securities that have become irrevocable and unconditional.	SSS
final transfer	an irrevocable and unconditional transfer which effects a discharge of the obligation to make the transfer. The terms “delivery” and “payment” are each defined as a final transfer. See also provisional transfer.	DVP Red Book Blue Book x-border SDF Retail
financial risk	term covering a range of risks incurred in financial transactions – both liquidity and credit risks. See also credit risk/exposure, liquidity risk.	Core Principles
firewall	a hardware- and/or software-based system that is used as an interface between the internet and a computer system to monitor and filter incoming and outgoing communications.	EM-Sec
fleckless	from the German “fleckelos”, which means spotless; a device (card) or a system is said to be fleckless when it can provide evidence that it has not been tampered with.	EM-Sec
forced settlement	securities or funds settlement that is either mandated or enforced by the actions of a third party.	SDF
foreign exchange settlement risk	the risk that one party to a foreign exchange transaction will pay the currency it sold but not receive the currency it bought. This is also called cross-currency settlement risk or principal risk; it is also referred to as Herstatt risk, although this is an inappropriate term given the differing circumstances in which this risk has materialised.	Blue Book
forward contract	a contract that obligates one party to buy, and the other to sell, an underlying asset at a specific price and date in the future.	ETDC OTC
forward rate agreement	a forward contract on interest rates in which the rate to be paid or received on a specific obligation for a set period of time, beginning at some time in the future, is determined at contract initiation.	OTC
free-of-payment delivery	delivery of securities with no corresponding payment of funds.	SLT
front office	a firm’s trading unit and other areas that are responsible for developing and managing relationships with counterparties. See back office.	OTC
FTS	see funds transfer system	
funds transfer system	a formal arrangement, based on private contract or statute law, with multiple membership, common rules and standardised arrangements, for the transmission and settlement of money obligations arising between the members. See also interbank funds transfer system.	Blue Book

Term	Definition	Source
fungibility	a concept that characterises the method of holding securities by a CSD or other financial intermediary in which each of a number of issues of physical or dematerialised securities are held in separate fungible pools. No owner has the right to any particular physical or dematerialised security in a particular pool, but has a right to such an amount of physical or dematerialised securities as shown in its account with a CSD or other financial intermediary.	Blue Book
futures contract	a standardised forward contract traded on an exchange.	ETDC
futures-style margining	a method of margining derivatives contracts in which positions are marked to market and current exposures are extinguished through cash payments known as variation margin. Both futures and options contracts can be margined in this manner. When options contracts are margined using a futures-style system, the option premium is gradually paid over the life of the option (through the cumulative variation margin payments) and fully paid once the option has been exercised. See also options-style margining.	ETDC
general collateral	securities that satisfy the general requirements of a lender of cash to collateralise its cash lending. General collateral comprises securities which are not in particular demand in the market; categories of general collateral are usually defined by market convention. See also special collateral.	SLT
giro system	see credit transfer system.	Red Book Blue Book
global custodian	a custodian that provides its customers with custody services in respect of securities traded and settled not only in the country in which the custodian is located but also in numerous other countries throughout the world.	x-border SDF SSS
gridlock	a situation that can arise in a funds or securities transfer system in which the failure of some transfer instructions to be executed (because the necessary funds or securities balances are unavailable) prevents a substantial number of other instructions from other participants from being executed. See also failed transaction, queuing, systemic risk.	Red Book Blue Book SDF
gross margining	margining system in which the clearing member is required to deposit with the clearing house sufficient initial margin to cover the gross positions of its clients. See also net margining.	ETDC
gross settlement system	a transfer system in which the settlement of funds or securities transfer instructions occurs individually (on an instruction by instruction basis).	x-border SDF
haircut	the difference between the market value of a security and its collateral value. Haircuts are taken by a lender of funds in order to protect the lender, should the need arise to liquidate the collateral, from losses owing to declines in the market value of the security. See also margin.	Red Book Blue Book SDF
hedge fund	a private investment fund, often leveraged, and often engaging in active trading strategies (including arbitrage). Hedge funds are typically subject to limited regulatory oversight.	SLT
Herstatt risk	see principal risk.	Red Book

Term	Definition	Source
home banking	banking services which a retail customer of a financial institution can access using a telephone, television set, terminal or personal computer as a telecommunications link to the institution's computer centre.	Red Book Blue Book EM-CPSS Retail
hot list	in a card-based system, a list - held by the merchant terminal or other device - of suspicious card numbers or ranges of suspicious card numbers. The hot list is used to detect and block any transaction with such cards.	EM-Sec
hybrid system	a payment system that combines characteristics of RTGS systems and netting systems.	Core Principles
IC card	see chip card.	Red Book Blue Book EM-CPSS
IC (integrated circuit) card	a plastic card in which one or more integrated circuits are embedded. Also called chip card.	EM-Sec
ICSD	see international central securities depository.	
IFTS	see interbank funds transfer system.	
immobilisation	placement of certificated securities and financial instruments in a central securities depository to facilitate book-entry transfers.	DVP Red Book Blue Book SDF
immobilisation	placement of physical certificates for securities and financial instruments in a central securities depository so that subsequent transfers can be made by book entry, that is, by debits from and credits to holders' accounts at the depository.	SSS
imprinter	mechanical device to reproduce the name and account number of a cardholder on a paper sales slip. See also imprinter voucher.	Red Book Blue Book
imprinter voucher	in card transactions, a sales slip that is to be signed by the customer on which the name and card number of the customer are imprinted. See also imprinter.	Red Book Blue Book
indemnification	an agreement to compensate for damage or loss. Custodians sometimes offer it to lending customers in a variety of forms.	SLT
indirect holding system	a holding system for securities in which (i) a nominee is reflected as the legal owner of securities on the official register of the issuer and the beneficial owner (or the intermediary through which the latter holds the security) is reflected as the owner of the securities on the books of the nominee or (ii) bearer securities are deposited with an intermediary and the intermediary maintains an account reflecting the beneficial owner's rights and interests in the security. The beneficial owner's rights and interests in securities in an indirect holding system are transferred by accounting entries on the nominee's or relevant intermediary's books.	SSS
indirect market participant	a market participant that uses an intermediary for the execution of trades on its behalf. Generally, institutional and cross-border clients are indirect market participants. See also indirect participant/member.	SSS

Term	Definition	Source
indirect participant/member	refers to a funds or securities transfer system in which there is a tiering arrangement. Indirect participants are distinguished from direct participants by their inability to perform some of the system activities (eg input of transfer orders, settlement) performed by direct participants. Indirect participants, therefore, require the services of direct participants to perform those activities on their behalf. In the EC context, the term refers more specifically to participants in a transfer system which are responsible only to their direct participants for settling the payments input to the system. See also direct participant/member, settling participant/member, tiering arrangement.	Red Book
initial margin	cash or collateral that is deposited with the clearing house to ensure performance on obligations to it (also known as performance bond and original margin).	ETDC
inpayment	payment instruction, sent together with the bill for the delivery of goods and/or services, which is prepared by the payee; the payer can either pay through its designated bank account or by means of a cash payment at a designated agent (bank or non-bank).	Retail
integrity	the quality of being protected against accidental or fraudulent alteration or of indicating whether or not alteration has occurred.	EM-Sec
interbank funds transfer system	a funds transfer system in which most (or all) direct participants are financial institutions, particularly banks and other credit institutions.	Red Book <i>Blue Book</i>
interchange fee	transaction fee payable in the context of a payment card network by one participating financial institution to another, for example by an acquirer to a card issuer in respect of a card payment by the cardholder to the card acceptor (merchant).	
interlinking	within the TARGET system, interlinking provides the common procedures and infrastructure which allow payment orders to move from one domestic RTGS system to another domestic RTGS system. See also TARGET.	Blue Book
internal settlement	a settlement that is effected through transfers of securities and funds on the books of a single intermediary. An internal settlement requires both counterparties to maintain their securities and funds accounts with the same intermediary.	x-border SDF
international central securities depository	a central securities depository which clears and settles international securities or cross-border transactions in domestic securities. At the moment there are two ICSDs located in EU countries, Clearstream and Euroclear.	Blue Book
international central securities depository	a central securities depository that settles trades in international securities and in various domestic securities, usually through direct or indirect (through local agents) links to local CSDs.	SSS
internet	an open worldwide communication infrastructure consisting of interconnected computer networks and allowing access to remote information and the exchange of information between computers.	EM-Sec EM-CPSS EM-ECB
interoperability	a situation in which payment instruments belonging to a given scheme may be used in other countries and in systems installed by other schemes. Interoperability requires technical compatibility between systems, but can only take effect where commercial agreements have been concluded between the schemes concerned.	EM-ECB

Term	Definition	Source
intraday credit	see daylight credit.	Red Book Blue Book
intraday liquidity	funds which can be accessed during the business day, usually to enable financial institutions to make payments in real time. See also intraday credit.	Core Principles
irrevocable and unconditional transfer	a transfer which cannot be revoked by the transferor and is unconditional.	Red Book Blue Book <i>DVP</i> <i>SDF</i>
irrevocable transfer	a transfer which cannot be revoked by the transferor.	
ISO	International Organization for Standardization: an international body whose members are national standards bodies and which approves, develops and publishes international standards.	EM-Sec
issuer	in a stored value or similar prepaid electronic money system, the entity which receives payment in exchange for value distributed in the system and which is obligated to pay or redeem transactions or balances presented to it.	EM-Sec EM-CPSS
issuer	the entity which is obligated on a security or other financial instrument. For example, a corporation or government having the authority to issue and sell a security, or a bank that approves a letter of credit. Issuer is sometimes used to refer to a financial institution that issues credit or debit cards.	Blue Book
issuing agent	an institution that acts on behalf of the issuer of securities in distributing the securities and in realising the proceeds thereof for the benefit of the issuer.	SDF
issuing institution	the institution receiving funds in exchange for value distributed in the system and, in principle, being obliged to pay or redeem the customer's transactions and unused funds which are presented to it. It is normally the institution which invests the float.	EM-ECB
key	a unique series of digits used in combination with a cryptographic algorithm.	EM-Sec
key length	the number of bits comprising an encryption key.	EM-Sec
key management	the design of the life cycle of keys and the relationships between keys which are used in a computer system for cryptographic purposes. Alternatively, when referring to a system in operation, the processes by which cryptographic keys used in a computer system are generated, stored and updated.	EM-Sec
large-value funds transfer system	a funds transfer system through which large-value and high-priority funds transfers are made between participants in the system for their own account or on behalf of their customers. Although, as a rule, no minimum value is set for the payments they carry, the average size of payments passed through such systems is usually relatively large. Large-value funds transfer systems are sometimes known as wholesale funds transfer systems.	EM-CPSS Blue Book
large-value payments	payments, generally of very large amounts, which are mainly exchanged between banks or between participants in the financial markets and usually require urgent and timely settlement.	EM-CPSS <i>Blue Book</i>
L/C	see letter of credit.	

Term	Definition	Source
legal ownership	recognition in law as the owner of a security or financial instrument. It is usually represented by holding "legal title" and sometimes distinguished from beneficial ownership/interest. See also beneficial ownership/interest, legal title.	SLT SDF
legal risk	the risk of loss because of the unexpected application of a law or regulation or because a contract cannot be enforced.	x-border ETDC OTC SDF SLT
legal risk	the risk that a party will suffer a loss because laws or regulations do not support the rules of the securities settlement system, the performance of related settlement arrangements, or the property rights and other interests held through the settlement system. Legal risk also arises if the application of laws and regulations is unclear.	SSS
legal title	one recognisable or enforceable in law or one which is complete and perfect as regards the apparent right of ownership, and possession, which may carry no beneficial interest.	SLT
letter of credit	a promise by a bank or other issuer to a third party to make payment on behalf of a customer in accordance with specified conditions. Frequently used in international trade to make funds available in a foreign location.	Red Book Blue Book
limit	see credit limit.	Core Principles
limited-purpose prepaid card	a prepaid card which can be used for a limited number of well defined purposes. Its use is often restricted to a number of well identified points of sale within a well identified location (eg a building, corporation or university). In the case of single-purpose prepaid cards, the card issuer and the service provider may be identical (eg cards used in public telephones). See also prepaid card.	Blue Book EM-CPSS
liquidity risk	the risk that a counterparty (or participant in a settlement system) will not settle an obligation for full value when due. Liquidity risk does not imply that a counterparty or participant is insolvent since it may be able to settle the required debit obligations at some unspecified time thereafter.	Red Book Blue Book
load	the action of transferring electronic balance from an issuer to a consumer's device.	EM-Sec
loading operator	the entity providing the technical infrastructure for loading transactions.	EM-ECB
local agent	a custodian that provides custody services for securities traded and settled in the country in which it is located to trade counterparties and settlement intermediaries located in other countries (non-residents).	x-border SDF
local custodian	a custodian that provides custody services for securities traded and settled in the country in which the custodian is located. See also global custodian.	SDF

Term	Definition	Source
long-form confirmation	a confirmation that includes key legal provisions from a master agreement. When no master agreement has been executed between the counterparties, use is sometimes made of a long-form confirmation or of a confirmation that incorporates by reference the standard terms of a master agreement.	OTC
long position	a condition in which the buyer or holder of securities owns more securities than it contracts to deliver. See also short sale.	SLT
loss-sharing agreement	an agreement among participants in a clearing or settlement system regarding the allocation of any losses arising from the default of a participant in the system or of the system itself.	SDF <i>DVP</i>
loss-sharing pools	cash, securities or possibly other assets that are provided by the participants in advance and are held by the system to ensure that commitments arising from loss-sharing agreements can be met.	SDF
loss-sharing rule	an agreement between participants in a transfer system or clearing house arrangement regarding the allocation of any loss arising when one or more participants fail to fulfil their obligation: the arrangement stipulates how the loss will be shared among the parties concerned in the event that the agreement is activated. Also called loss-sharing agreement.	Red Book Blue Book
MAC	message authentication code: a hash algorithm parameterised with a key to generate a number which is attached to the message and is used to authenticate it and to guarantee the integrity of the data transmitted.	EM-Sec
magnetic ink character recognition	a technique, using special MICR machine-readable characters, by which documents (ie cheques, credit transfers, direct debits) are read by machines for electronic processing. See also optical character recognition.	Red Book Blue Book
manufactured payment	an equivalent payment made by the borrower of securities to the lender in lieu of actual dividends or other income earned on the securities (net of any applicable taxes), which the lender would have received if it had not lent the securities.	SLT
margin	margin has at least two meanings. In the futures/commodity markets, margin is a good faith deposit (of money, securities or other financial instruments) required by the futures clearing system to assure performance. In the equities markets, margin is a sum of money deposited by a customer when borrowing money from a broker to purchase shares. The money deposited with the broker is the difference between the purchase value of the shares and the collateral value of the shares. See also haircut.	Red Book Blue Book <i>DVP</i>
margin	generally, the term for collateral used to secure an obligation, either realised or potential. In securities markets, the collateral deposited by a customer to secure a loan from a broker to purchase shares. In organisations with a central counterparty, the deposit of collateral to guarantee performance on an obligation or cover potential market movements on unsettled transactions is sometimes referred to as margin.	SSS
margin call	a demand for additional funds or collateral, following the marking to market of a securities lending transaction, if the market value of underlying collateral falls below a certain level relative to the loaned asset. Similarly, if the value of the underlying collateral assets, following their revaluation, were to exceed the agreed margin, the return of collateral might be required.	SLT

Term	Definition	Source
market risk	the risk of losses in on- and off-balance sheet positions arising from movements in market prices.	ETDC
market value	the cost that would be incurred or the gain that would be realised if an outstanding contract were replaced at current market prices. Also called replacement value.	OTC
marking to market	the practice of revaluing securities and financial instruments using current market prices. In some cases, unsettled contracts to purchase or sell securities are marked to market and the counterparty with an as yet unrealised loss on the contract is required to transfer funds or securities equal to the value of the loss to the other counterparty.	DVP Red Book Blue Book SLT <i>SDF</i>
marking to market	the revaluation of open positions in financial instruments at current market prices and the calculation of any gains or losses that have occurred since the last valuation. See also futures-style margining, options-style margining, variation margin.	ETDC OTC
mask	the hardware specifications that define the physical and functional properties of the IC chip.	EM-Sec
master agreement	an agreement that sets forth the standard terms and conditions applicable to all or a defined subset of transactions that the parties may enter into from time to time, including the terms and conditions for closeout netting.	OTC
master key	a cryptographic key, often used to generate other cryptographic keys.	EM-Sec
master master agreement	an umbrella agreement that provides for closeout netting of transactions governed by different master agreements. For example, where the parties have used separate master agreements to cover different types of OTC derivatives transaction, the parties may enter into a master master agreement in an effort to achieve a greater reduction of credit risk.	OTC
matched book	portfolio of assets and portfolio of liabilities having equal maturities. The term is used most often in reference to money market instruments and money market liabilities. In reference to securities lending, this entails borrowing securities and then relending the same securities for an equivalent period for the purpose of borrowing and lending money at a locked-in rate. In contrast, an unmatched book refers to borrowing and lending of the same securities for different maturities to take a short or long interest rate position.	SLT
matching	the process for comparing the trade or settlement details provided by counterparties to ensure that they agree with respect to the terms of the transaction. Also called comparison checking.	SLT
memory card	an IC (integrated circuit) card capable of storing information only.	EM-Sec
MICR	see magnetic ink character recognition.	

Term	Definition	Source
minimum standards of the lamfalussy report (Lamfalussy standards)	the six minimum standards for the design and operation of cross-border and multicurrency netting schemes or systems. (i) Netting systems should have a well founded legal basis under all relevant jurisdictions. (ii) Netting scheme participants should have a clear understanding of the impact of the particular scheme on each of the financial risks affected by the netting process. (iii) Multilateral netting systems should have clearly defined procedures for the management of credit risks and liquidity risks which specify the respective responsibilities of the netting provider and the participants. These procedures should also ensure that all parties have both the incentives and the capabilities to manage and contain each of the risks they bear and that limits are placed on the maximum level of credit exposure that can be produced by each participant. (iv) Multilateral netting systems should, at a minimum, be capable of ensuring the timely completion of daily settlements in the event of an inability to settle by the participant with the largest single net debit position. (v) Multilateral netting systems should have objective and publicly disclosed criteria for admission which permit fair and open access. (vi) All netting schemes should ensure the operational reliability of technical systems and the availability of backup facilities capable of completing daily processing requirements.	Blue Book
monetary aggregate	a composite monetary variable used as a measure of the money supply (and as such sometimes adopted as an intermediate monetary policy objective or as an indicator of monetary conditions) comprising a varying range of liquid assets depending on its definition. Monetary aggregates range from narrow to broad. The narrowly defined aggregate M1 typically includes currency and demand deposits.	EM-CPSS
money laundering	the attempt to conceal or disguise the ownership or source of the proceeds of criminal activity and to integrate them into the legitimate financial systems in such a way that they cannot be distinguished from assets acquired by legitimate means. Typically this involves the conversion of cash-based proceeds into account-based forms of money.	EM-CPSS EM-ECB
money order	an instrument used to remit money to the named payee, often used by persons who do not have a chequing account relationship with a financial institution, to pay bills or to transfer money to another person or to a company. There are three parties to a money order: the remitter (payer), the payee and the drawee. Drawees are usually financial institutions or post offices. Payees can either cash their money orders or present them to their bank for collection.	Red Book Blue Book <i>Retail</i>
multifunctional cards	a card which, in addition to a stored value card function, may include other payment facilities such as a debit or credit card function and/or non-payment facilities.	EM-ECB
multilateral credit limit	see credit limit.	Core Principles
multilateral net settlement position	the sum of the value of all the transfers a participant in a net settlement system has received during a certain period of time less the value of the transfers made by the participant to all other participants. If the sum is positive, the participant is in a multilateral net credit position; if the sum is negative, the participant is in a multilateral net debit position.	Red Book Blue Book

Term	Definition	Source
multilateral net settlement system	a settlement system in which each settling participant settles (typically by means of a single payment or receipt) the multilateral net settlement position which results from the transfers made and received by it, for its own account and on behalf of its customers or non-settling participants for which it is acting. See also direct participant, multilateral net settlement position, multilateral netting, settling participant/member.	Red Book Blue Book
multilateral netting	an arrangement among three or more parties to net their obligations. The obligations covered by the arrangement may arise from financial contracts, transfers or both. The multilateral netting of payment obligations normally takes place in the context of a multilateral net settlement system. See also bilateral netting, multilateral net settlement position, multilateral net settlement system.	Red Book Blue Book
multilateral netting	netting on a multilateral basis is arithmetically achieved by summing each participant's bilateral net positions with the other participants to arrive at a multilateral net position. Such netting is conducted through a central counterparty (such as a clearing house) that is legally substituted as the buyer to every seller and the seller to every buyer. The multilateral net position represents the bilateral net position between each participant and the central counterparty. See also netting.	OTC
multiple issuer scheme	a scheme in which more than one institution acts as issuer.	EM-ECB
multipurpose prepaid card	a prepaid card which can be used at the outlets of several service providers for a wide range of purposes, and which has the potential to be used on a national or international scale but may sometimes be restricted to a certain area. See also electronic purse, prepaid card.	Blue Book <i>EM-ECB</i>
multipurpose prepaid card scheme	a scheme in which at least three parties are involved: the issuer, the cardholder and the acceptor of the card. (Where one acceptor currently exists, it must be possible for other legally distinct acceptors to join the scheme.)	EM-ECB
mutual offset system	a link between clearing houses in which positions entered into on one exchange can be transferred to the clearing house of another exchange and vice versa. Also, positions need not be transferred.	ETDC
net credit (or debit) position	a participant's net credit or net debit position in a netting system is the sum of the value of all the transfers it has received up to a particular point in time less the value of all transfers it has sent. If the difference is positive, the participant is in a net credit position; if the difference is negative, the participant is in a net debit position. The net credit or net debit position at settlement time is called the net settlement position. These net positions may be calculated on a bilateral or multilateral basis.	DVP Red Book Blue Book SDF
net debit cap	see caps, net credit (or debit) position.	Red Book Blue Book
net margining	margining system in which the clearing member is required to deposit with the clearing house sufficient initial margin to cover the net positions of its clients. Clients, however, are typically still obligated to deposit with the clearing member initial margin to cover their own positions. See also gross margining.	ETDC

Term	Definition	Source
net settlement	the settlement of a number of obligations or transfers between or among counterparties on a net basis. See also netting.	DVP Red Book Blue Book SDF
net settlement system	a system in which transfer orders are settled on a net basis. Some systems distinguish between types of transfer orders and settle some, such as payment orders, on a net basis and others, such as securities transfer orders, on an instruction by instruction basis.	x-border DVP
net settlement system	a funds transfer system whose settlement operations are completed on a bilateral or multilateral net basis.	Blue Book Red Book
net settlement system	a settlement system in which final settlement of transfer instructions occurs on a net basis at one or more discrete, prespecified times during the processing day.	SSS
netting	an agreed offsetting of positions or obligations by trading partners or participants. The netting reduces a large number of individual positions or obligations to a smaller number of obligations or positions. Netting may take several forms which have varying degrees of legal enforceability in the event of default of one of the parties. See also bilateral netting, multilateral netting, novation, position netting, substitution.	DVP Red Book Blue Book SDF
netting	an agreed offsetting of mutual obligations by trading partners or participants in a system, including the netting of trade obligations, for example through a central counterparty, and also agreements to settle securities or funds transfer instructions on a net basis.	SSS
netting by novation	netting by novation agreements provide for individual forward-value contractual commitments (eg foreign exchange contracts) to be discharged at the time of their confirmation and replaced by new obligations forming part of a single agreement. Amounts due under a discharged contract will be added to running balances due between the parties in each currency at each future value date.	Blue Book
network money	electronic money which is transferred via telecommunications networks such as the internet.	EM-ECB
nominee	a person or entity named by another to act on his behalf. A nominee is commonly used in a securities transaction to obtain registration and legal ownership of a security.	DVP Red Book Blue Book SDF
non-bank financial institution	a financial institution that does not come under the definition of a "bank" (eg a financial institution other than a credit institution in Europe or a depository institution in the United States).	EM-CPSS
non-cash clearing	a method for clearing futures contracts in which positions are periodically marked to market and resulting obligations are collateralised. See also cash clearing.	ETDC
non-repudiability	the ability to prevent denial or repudiation by the sender or receiver of a payment message.	Core Principles
note-based system	an electronic money system in which the electronic funds are represented by records (electronic notes) that are uniquely identified by a serial number and are associated with a fixed, unchangeable denomination.	EM-Sec

Term	Definition	Source
novation	satisfaction and discharge of existing contractual obligations by means of their replacement by new obligations (whose effect, for example, is to replace gross with net payment obligations). The parties to the new obligations may be the same as those to the existing obligations or, in the context of some clearing house arrangements, there may additionally be substitution of parties. See also substitution.	Red Book Blue Book
obligation	a duty imposed by contract or law. It is also used to describe a security or other financial instrument, such as a bond or promissory note, which contains the issuer's undertaking to pay the owner.	DVP Red Book Blue Book SDF <i>Retail</i>
OCR	see optical character recognition.	
off-balance sheet transactions	financial transactions that are not reflected on the balance sheet of the financial institution conducting them. An example would be the purchase or sale of financial assets in futures markets.	EM-CPSS
offline	in the context of payment and settlement systems, the term may refer to the transmission of transfer instructions by users, through such means as voice, written or telefaxed instructions, that must subsequently be input into a transfer processing system. The term may also refer to the storage of data by the transfer processing system on media such as magnetic tape or disk such that the user may not have direct and immediate access to the data. See also online.	Red Book Blue Book <i>Retail</i>
offsetting	see netting.	Core Principles
omnibus account	a single account for the commingled funds or positions of multiple parties. A clearing member will often maintain an omnibus account at the clearing house for all of the clearing member's clients. In this case, the clearing member is responsible for maintaining account records for individual clients.	ETDC
omnibus customer account	an account in which the securities held by a participant on behalf of all (or at least several) of its customers are kept. See also proprietary account, segregation.	SDF
one-way hash function	a mathematical algorithm (hash algorithm) applied to a message to generate a number that is attached to the message and is used to verify the integrity of the data transmitted. The result of the application of a hash function to a message is called a hash value.	EM-Sec
onlend	to borrow a security from one party and then lend the same security to another party.	SLT
online	in electronic money systems, indicates that a direct connection is made to a centralised computer system for authorisation or validation before a transaction can be executed.	EM-Sec
online	in the context of payment and settlement systems, this term may refer to the transmission of transfer instructions by users, through such electronic means as computer-to-computer interfaces or electronic terminals, that are entered into a transfer processing system by automated means. The term may also refer to the storage of data by a transfer processing system on a computer database such that the user has direct access to the data (frequently in real time) through input/output devices such as terminals.	Red Book Blue Book EM-CPSS EM-ECB <i>Retail</i>

Term	Definition	Source
opening (or front) leg	first leg of a pair of transactions in the same securities, ie a securities lending transaction - one for a near value date, the other for a value date further into the future. See also closing (or back) leg.	SLT
open market sales	sales of marketable securities conducted in secondary financial markets by central banks in order to reduce the amount of bank reserves (liquidity) held by banks.	EM-CPSS
open network	telecommunications network to which access is not restricted.	EM-Sec EM-ECB Retail
open offer netting	describes a contractual means by which a third party, such as a clearing house, becomes party to a transaction agreed by two separate entities. The third party extends an "open offer" to those entities, with the effect that if they agree the terms of a transaction which satisfies certain pre-agreed conditions, the third party automatically and immediately becomes interposed in that transaction. Two separate, equal and opposite contractual obligations are created, between the clearing house and one party, and between the clearing house and the other entity. If all pre-agreed conditions are met, at no stage does a direct contractual obligation exist between the two entities.	x-border Blue Book
open outcry trading	trading that is conducted on the floor of an exchange without any electronic intermediation. See also screen-based trading.	ETDC
open transactions	transactions with no fixed maturity date, with the possibility of terminating the transaction or refixing its terms or substituting collateral daily.	SLT
operating system	that part of the software of a computer system (including chips) that is closely tied to the hardware on which it runs and that performs basic input/output operations, computations, memory management, etc.	EM-Sec
operational risk	the risk that deficiencies in information systems or internal controls could result in unexpected losses.	Red Book
operational risk	the risk of human error or a breakdown of some component of the hardware, software or communications systems that are crucial to settlement.	ETDC SLT
operational safe custody accounts	securities accounts run by the central bank in which credit institutions can place securities deemed suitable for the backing of central bank operations. The securities held on these accounts are finally deposited with the CSD under the name of the national central bank (NCB), so that the transfer into a safe custody account results in a transfer between the bank's and the NCB's account with the CSD. The securities deposited with the NCB are generally pledged to the NCB as collateral for (interest bearing) overnight and (interest free) intraday lombard loans. They can also be used for open market transactions (repos) based on a general authorisation given to the NCB to acquire securities.	x-border Blue Book
optical character recognition	a technique, using special OCR machine-readable characters, by which documents (eg cheques, credit transfers, direct debits) are read by machines for electronic processing. See also magnetic ink character recognition.	Red Book x-border Blue Book

Term	Definition	Source
optimisation routine	routine processes in a payment system to determine the order in which payments are accepted for settlement. Optimisation routines are used to improve system liquidity and increase settlement efficiency. See also queuing, scheduling.	Core Principles
option contract	a contract that gives the buyer the right, but not the obligation, to buy or sell an underlying asset by (or on) a specific date for a specific price. For this right the purchaser pays a premium.	OTC ETDC
options-style margining	a method of margining derivative contracts in which positions are marked to market and current exposures are collateralised. When an option contract is margined using such a system, the buyer of the option pays the premium in full at the time of the purchase. The seller of the option receives the premium and collateralises current exposures as they occur. See also futures-style margining.	ETDC
out-of-the-money	a term used to describe an option contract that would produce a negative cash flow for the holder if it were exercised now.	OTC
overnight money	a loan with a maturity of one business day. Also called day-to-day money.	Red Book x-border Blue Book
oversight	a public policy activity principally intended to promote the safety and efficiency of payment and securities settlement systems and in particular to reduce systemic risk.	SSS
oversight of payment systems	a central bank task, principally intended to promote the smooth functioning of payment systems and to protect the financial system from possible “domino effects” which may occur when one or more participants in the payment system incur credit or liquidity problems. Payment systems oversight aims at a given system (eg a funds transfer system) rather than individual participants.	x-border Blue Book
over the counter	a method of trading that does not involve an exchange. In over-the-counter markets, participants trade directly with each other, typically through telephone or computer links.	ETDC OTC SLT
paperless credit transfers	credit transfers that do not involve the exchange of paper documents between banks. Other credit transfers are referred to as being paper-based.	Red Book x-border Blue Book Retail
participant/member	a party who participates in a transfer system. This generic term refers to an institution which is identified by a transfer system (eg by a bank identification number) and is allowed to send payment orders directly to the system or which is directly bound by the rules governing the transfer system. See also direct participant/ member, indirect participant/member.	Red Book x-border Blue Book SDF
paying agent	an institution that, acting on behalf of an issuer, makes payments to holders of securities (eg payments of interest or principal).	SDF
payment	the payer’s transfer of a monetary claim on a party acceptable to the payee. Typically, claims take the form of banknotes or deposit balances held at a financial institution or at a central bank.	Red Book Blue Book EM-CPSS EM-ECB
payment card company	a company which owns trademarks of payment cards (credit, debit or prepaid cards) and may also provide a number of marketing, processing or other services to institutions issuing its cards.	EM-ECB
payment instrument	any instrument enabling the holder/user to transfer funds.	EM-ECB

Term	Definition	Source
payment lag	the time lag between the initiation of the payment order and its final settlement.	Red Book x-border Blue Book
payment message/instruction	an order or message to transfer funds (in the form of a monetary claim on a party) to the order of the beneficiary. The order may relate either to a credit transfer or to a debit transfer. See also credit transfer, debit transfer system, payment.	Core Principles
payment netting	settling payments due on the same date and in the same currency on a net basis.	OTC
payment order	an order or message requesting the transfer of funds (in the form of a monetary claim on a party) to the order of the payee. The order may relate either to a credit transfer or to a debit transfer. Also called payment instruction.	Red Book Blue Book Retail
payment system	a payment system consists of a set of instruments, banking procedures and, typically, interbank funds transfer systems that ensure the circulation of money.	Red Book Blue Book EM-CPSS EM-ECB Retail
payment versus payment	a mechanism in a foreign exchange settlement system which ensures that a final transfer of one currency occurs if and only if a final transfer of the other currency or currencies takes place.	Blue Book
PCMCIA card	personal computer media control interface adapter: a device that is attached externally to a PC and can perform various functions such as memory storage and modem communications. PCMCIA cards can be designed in such a way as to provide a certain level of tamper-resistance.	EM-Sec
personal identification number	a numeric code which the cardholder may need to quote for verification of identity. In electronic transactions, it is seen as the equivalent of a signature.	Red Book Blue Book Retail
personalisation	the phase of the IC card manufacturing process during which customer information is loaded into the card.	EM-Sec
PIN	see personal identification number	
plaintext	data which are not encrypted and are therefore in a readable form.	EM-Sec
plain vanilla transactions	the most common and generally the simplest types of derivatives transaction. Plain vanilla is a relative concept, and no precise list of plain vanilla transactions exists. Transactions that have unusual or less common features are often called exotic or structured.	OTC
pledge	a delivery of property to secure the performance of an obligation owed by one party (debtor/pledgor) to another (secured party). A pledge creates a security interest (lien) in the property so delivered. See also security interest.	OTC SLT
point of sale	this term refers to the use of payment cards at a retail location (point of sale). The payment information is captured either by paper vouchers or by electronic terminals, which in some cases are designed also to transmit the information. Where this is so, the arrangement may be referred to as "electronic funds transfer at the point of sale" (EFTPOS).	Red Book Blue Book Retail
POS	see point of sale.	

Term	Definition	Source
position limit	a restriction on the number of contracts or share of a contract's open interest that a single entity may hold.	ETDC
position netting	the netting of instructions in respect of obligations between two or more parties which neither satisfies nor discharges those original individual obligations. Also referred to as payment netting, in the case of payment instructions, and advisory netting.	DVP Red Book <i>Blue Book</i> SDF
potential future exposure	the additional exposure that a counterparty might potentially assume during the life of a contract or set of contracts beyond the current replacement cost of the contract or set of contracts. See also current exposure.	OTC
prefunding	the requirement that funds be available in accounts at the settlement institution before institutions use these accounts to extinguish their settlement obligations.	Core Principles
pre-matching process	process for comparison of trade or settlement information between counterparties that occurs before other matching or comparison procedures. Generally, pre-matching does not bind counterparties as matching can do.	SDF
prepaid card	a card on which value is stored, and for which the holder has paid the issuer in advance. See also electronic purse, limited-purpose prepaid card, multipurpose prepaid card, stored value card.	EM-CPSS
prepaid card acceptor	the party agreeing to deliver goods or services against payments made with a prepaid card.	EM-ECB
prepaid cardholder	the customer associated with the prepaid cardholder's identification on the card or the customer owning the card in the case of anonymous card products not related to any account.	EM-ECB
pre-settlement risk (replacement cost risk)	the risk that a counterparty to an outstanding transaction for completion at a future date will fail to perform on the contract or agreement during the life of the transaction. The resulting exposure is the cost of replacing the original transaction at current market prices and is also known as replacement cost risk. See also credit risk/exposure.	OTC SSS
prime brokerage	the provision by firms (eg large securities houses) of credit, clearing, securities lending and other services to clients (typically hedge funds).	SLT
principal	a party to a transaction that acts on its own behalf. In acting as a principal, a firm is buying/selling (or lending/borrowing) from its own account for position and risk, expecting to make a profit. A lender institution offering customers' securities on an undisclosed basis may also be considered to be acting as principal.	SLT
principal risk	the risk that the seller of a security delivers a security but does not receive payment or that the buyer of a security makes payment but does not receive delivery. In this event, the full principal value of the securities or funds transferred is at risk.	DVP SLT x-border ETDC SDF

Term	Definition	Source
principal risk	the credit risk that a party will lose the full value involved in a transaction. In the settlement process, this term is typically associated with exchange-for-value transactions when there is a lag between the final settlement of the various legs of a transaction (ie the absence of delivery versus payment). Principal risk that arises from the settlement of foreign exchange transactions is sometimes called cross-currency settlement risk or Herstatt risk. See also credit risk/exposure.	Red Book Blue Book
principal-to-principal relationship	a contractual relationship in which both parties are acting on their own behalf and are responsible for performance of any contractual obligations.	ETDC
privacy	in the context of a payment system, the fact that no information which might permit determination of behaviour may be collected without the consent of the individual to whom it relates.	EM-Sec EM-ECB
property interest	a generic term that refers to the exclusive right or interest of possessing, enjoying and disposing of a specific property.	SLT
proprietary account	an account in which a participant holds only those securities it is holding on its own behalf (as opposed to those securities it is holding on behalf of its customers). See also omnibus customer account, segregation.	SDF
proprietary positions	positions held by a participant on its own behalf (as opposed to positions held for clients).	ETDC
proprietary (trading)	trading in securities or derivatives for the account of a firm itself, rather than on behalf of clients.	
protocol	procedures for the interchange of electronic messages between communicating devices.	EM-Sec
provider	operator who establishes the hardware and software conditions for the conduct of transactions with electronic money, without necessarily being the issuer of the electronic money units.	EM-ECB
provisional transfer	a conditional transfer in which one or more parties retain the right by law or agreement to rescind the transfer.	DVP Red Book x-border Blue Book SDF
public disclosure	making information publicly accessible, for example by posting on an internet website or by making copies publicly available.	Core Principles
public key cryptography	see asymmetric cryptography.	EM-Sec
PVP	see payment versus payment.	
queuing	a risk management arrangement whereby transfer orders are held pending by the originator/deliverer or by the system until sufficient cover is available in the originator's/deliverer's clearing account or under the limits set against the payer; in some cases, cover may include unused credit lines or available collateral. See also caps.	Red Book Blue Book
RAM	random-access memory: the volatile memory area of a chip that is used for calculations and can only store data when electrical current is being supplied.	EM-Sec
real time	the processing of instructions on an individual basis at the time they are received rather than at some later time.	DVP SDF

Term	Definition	Source
real-time gross settlement	the continuous (real-time) settlement of funds or securities transfers individually on an order by order basis (without netting).	ETDC SLT
real-time risk management	process that allows risk associated with payments between payment system participants to be managed immediately and continuously.	Core Principles
real-time transmission, processing or settlement	the transmission, processing or settlement of a funds or securities transfer instruction on an individual basis at the time it is initiated.	Red Book Blue Book
rebate	the interest rate that a securities lender pays the borrower on cash collateral. This will normally be a below market rate to reflect the lending fee.	SLT
recall	a demand by a securities lender for the return of securities from the borrower where they are lent on an open transaction.	SLT
receiver finality	analytical rather than operational or legal term used to describe the point at which an unconditional obligation arises on the part of the receiving participant in a transfer system to make final funds available to its beneficiary customer on the value date. See also final settlement.	Red Book Blue Book
registration	the listing of ownership of securities in the records of the issuer or its transfer agent/registrar.	Red Book Blue Book
remote access to a CSD	the facility for a securities settlement system (SSS) in one country ("home country") to become a direct participant in a CSD established in another country ("host country") and, for that purpose, to have a securities account in its own name with the CSD in the host country. See also securities settlement system.	Blue Book
remote access to an IFTS	the facility for a credit institution established in one country ("home country") to become a direct participant in an interbank funds transfer system (IFTS) established in another country ("host country") and, for that purpose, to have a settlement account in its own name with the central bank in the host country, if necessary, without having established a branch in the host country.	Blue Book
remote participant	a participant in a transfer system which has neither its head office nor any of its branches located in the country where the transfer system is based.	Red Book Blue Book
remote payment	payment carried out through the sending of payment orders or payment instruments (eg by mail). Contrast with face-to-face payment.	Red Book Blue Book EM-ECB <i>Retail</i>
replacement cost risk	the risk that a counterparty to an outstanding transaction for completion at a future date will fail to perform on the settlement date. This failure may leave the solvent party with an unhedged or open market position or deny the solvent party unrealised gains on the position. The resulting exposure is the cost of replacing, at current market prices, the original transaction. Also called market risk, price risk. See also credit risk/exposure.	DVP Red Book x-border Blue Book SDF ETDC
repo	see repurchase agreement.	
repo rate	the return earned on a repo transaction expressed as an interest rate on the cash side of the transaction.	SLT

Term	Definition	Source
repricing/ revaluation	the act of marking to market.	SLT
repudiation	the denial by one of the parties to a transaction of participation in all or part of that transaction or of the content of the communication.	EM-Sec
repurchase agreement	a contract to sell and subsequently repurchase securities at a specified date and price. Also known as an RP or buyback agreement.	x-border SLT
reservable deposits	bank deposits subject to reserve requirements.	EM-CPSS
reserve requirement	the obligation for banks to maintain balances (bank reserves) at the central bank in respect of certain types of liabilities (in some cases vault cash can be counted towards this).	EM-CPSS
respondent	see correspondent banking.	Red Book
retailer card	a card issued by non-banking institutions, to be used in specified stores. The holder of the card has usually been granted a line of credit.	Red Book Blue Book
retail funds transfer system	a funds transfer system which handles a large volume of payments of relatively low value in such forms as cheques, credit transfers, direct debits, ATM and EFTPOS transactions.	Red Book Blue Book EM-CPSS Retail
retail payments	this term describes all payments which are not included in the definition of large-value payments. Retail payments are mainly consumer payments of relatively low value and urgency.	Blue Book EM-CPSS EM-ECB
retail transactions	see retail payments.	EM-CPSS
reuse of collateral (rehypotheca- tion)	a party's pledging or transferring to another party of collateral that was pledged or transferred to it. The term rehypothecation is generally used to refer to pledging collateral that was pledged.	OTC
reverse engineering	the process of analysing software code in order to determine how the software works.	EM-Sec
reverse repo	a contract with a counterparty to buy and subsequently resell securities at a specified date and price, the mirror image of a repo.	SLT
revocable transfer	a transfer that a system operator or a system participant can rescind.	SSS
risk factor	a variable that affects the value of financial instruments or an entire portfolio. The most common market risk factors are interest rates, foreign exchange rates, equity prices and commodity prices.	OTC
risk management test	test carried out on payments submitted to a payment system in order to establish whether processing a particular payment would cause the system or its participants greater risk than permitted under the rules of the system.	Core Principles

Term	Definition	Source
rolling settlement	a situation in which settlement of securities transactions takes place each day, the settlement of an individual transaction taking place a given number of days after the deal has been struck. This is in contrast to a situation in which settlement takes place only on certain days - for example, once a week or once a month - and the settlement of an individual transaction takes place on the next settlement day (or sometimes the next but one settlement day) following the day on which the deal is struck.	SLT SDF
rolling settlement	a procedure in which settlement takes place a given number of business days after the date of the trade. This is in contrast to account period procedures in which the settlement of trades takes place only on a certain day, for example a certain day of the week or month, for all trades that occurred within the account period.	SSS
ROM	read-only memory: typically the area of a chip that holds the operating system and possibly parts of the application.	EM-Sec
RSA	Rivest, Shamir, Adleman: a commonly used asymmetric cryptographic algorithm.	EM-Sec
RTGS	see real-time gross settlement.	
SAM	security application module: a tamper-resistant computer component typically integrated into a terminal.	EM-Sec
same day funds	money balances that the recipient has a right to transfer or withdraw from an account on the day of receipt.	DVP Red Book x-border Blue Book SDF
scattering	the process of mixing the IC chip components so that they cannot be analysed easily.	EM-Sec
scheduling	technique to manage payment queues by determining the order in which payments are accepted for settlement. See also optimisation routine, queuing.	Core Principles
screen-based trading	trading conducted through a network of electronic terminals. See also open outcry trading.	ETDC
secret key cryptography	see symmetric cryptography.	EM-Sec
secured party	a party that holds collateral that secures its claims on a debtor.	OTC
securities borrowing and lending programme	a facility whereby a loan of securities is made to facilitate timely fulfilment of settlement obligations.	SDF
securities depository	see central securities depository.	Red Book Blue Book SDF
securities-driven securities lending transactions	transactions whose motivation lies in borrowing/lending specific securities via a repo or securities loan. See also cash-driven securities lending transactions.	SLT
securities loan	a loan of securities, with or without collateral, to facilitate timely fulfilment of settlement obligations.	x-border

Term	Definition	Source
securities settlement system	a system which permits the transfer of securities: either free of payment (free delivery), for example in the case of pledge; or against payment. Settlement of securities occurs on securities deposit accounts held with the CSD (both private CSDs or a national central bank acting as a CSD) or with the central bank (safe custody operational accounts). In the latter case, the central bank acts as the intermediate custodian of the securities. The final custodian is normally a CSD. Settlement of cash occurs in an interbank funds transfer system (IFTS), through a settlement agent.	Blue Book
securities settlement system	the full set of institutional arrangements for confirmation, clearance and settlement of securities trades and safekeeping of securities.	SSS
security interest	a form of interest in property which provides that the property may be sold on default in order to satisfy the obligation covered by the security interest.	OTC SLT
segregation	a method of protecting client assets and positions by holding or accounting for them separately from those of the carrying firm or broker.	ETDC
seigniorage	in a historical context, the term seigniorage was used to refer to the share, fee or tax which the seignior, or sovereign, took to cover the expenses of coinage and for profit. With the introduction of paper money, larger profits could be made because banknotes cost much less to produce than their face value. When central banks came to be monopoly suppliers of banknotes, seigniorage came to be reflected in the profits made by them and ultimately their major or only shareholder, the government. Seigniorage can be estimated by multiplying notes and coin outstanding (non-interest bearing central bank liabilities) by the long-term rate of interest on government securities (a proxy for the return on central bank assets).	EM-CPSS EM-ECB
self-collateralising	an arrangement whereby securities being transferred can be used as collateral to secure risks involved in the transfer process.	SDF
sell-buybacks (or buy-sellbacks)	transactions that have the same economic effect and intent as a repurchase agreement and which consist of two distinct simultaneous purchase and sale transactions for different value dates - one for immediate settlement and the other for forward settlement. Typically, sell-buybacks do not allow for marking to market and margin calls.	SLT
sender finality	analytical rather than operational or legal term used to describe the point at which an unconditional obligation arises on the part of the initiating participant in a funds transfer system to make final payment to the receiving participant on the value date. See also final settlement.	Red Book Blue Book
sequence number	a number attributed sequentially to a message and attached to it to prevent the duplication or loss of messages.	EM-Sec
server	a computer that provides services through a network to other computers.	EM-Sec
session key	a cryptographic key which is used for a limited time, such as a single communication session or transaction, then discarded.	EM-Sec

Term	Definition	Source
set off	a method of cancelling or offsetting reciprocal obligations and claims (or the discharge of reciprocal obligations up to the amount of the smaller obligations). Set off can operate by force of law or pursuant to a contract.	OTC
settlement	an act that discharges obligations in respect of funds or securities transfers between two or more parties. See also final settlement, gross settlement system, net settlement, net settlement system.	Red Book EM-CPSS Blue Book EM-ECB Retail
settlement	the completion of a transaction, wherein the seller transfers securities or financial instruments to the buyer and the buyer transfers money to the seller. A settlement may be final or provisional.	DVP <i>x-border</i> SDF
settlement agent	an institution that manages the settlement process (eg the determination of settlement positions, monitoring of the exchange of payments, etc) for transfer systems or other arrangements that require settlement. See also cash settlement agent, final settlement, multilateral net settlement system, settlement, settlement institution.	Red Book Blue Book
settlement asset	an asset used for the discharge of settlement obligations as specified by the rules, regulations or customary practice for a payment system.	Core Principles
settlement bank	either a central bank or private bank used to effect money settlements.	ETDC
settlement bank	the entity that maintains accounts with the settlement agent in order to settle payment obligations arising from securities transfers, both on its own behalf and for other market participants.	SSS
settlement date	the date on which the parties to a securities transaction agree that settlement is to take place. The intended date is sometimes referred to as the contractual settlement date.	x-border SDF
settlement finality	see final settlement.	Red Book Blue Book
settlement institution	the institution across whose books transfers between participants take place in order to achieve settlement within a settlement system. See also bilateral net settlement system, multilateral net settlement system, settlement agent, settling participant/member.	Red Book Blue Book
settlement interval	the amount of time that elapses between the trade date (T) and the settlement date (S). Typically measured relative to the trade date, eg if three days elapse, the settlement interval is T+3.	x-border SLT SDF
settlement lag	in an exchange-for-value process, the time lag between entering into a trade/bargain and its discharge by the final exchange of a financial asset for payment. See also payment lag.	Red Book Blue Book
settlement obligation	an amount due from a financial institution to other financial institutions as a result of the clearing of payments. See also net credit (or debit) position.	Core Principles
settlement risk	general term used to designate the risk that settlement in a transfer system will not take place as expected. This risk may comprise both credit and liquidity risk.	Red Book Blue Book SDF Retail

Term	Definition	Source
settlement risk	the risk that a party will default on one or more settlement obligations to its counterparties or to a settlement agent.	DVP
settlement system	a system used to facilitate the settlement of transfers of funds or financial instruments.	Blue Book EM-CPSS EM-ECB
settling participant/member	in some countries, a settling participant in a funds or securities transfer system delivers and receives funds or securities to/from other settling participants through one or more accounts at the settlement institution for the purpose of settling funds or securities transfers for the system. Other participants require the services of a settling participant in order to settle their positions. Currently, in the EC direct participants are by definition also settling participants. See also direct participant/member, tiering arrangement.	Red Book
share book-entry system	a computerised system for the issue and registration of equity securities in book-entry form. See also book-entry system, debt book-entry system.	Blue Book
short sale	a sale of securities which the seller does not own and thus must be covered by the time of delivery; a technique used (1) to take advantage of an anticipated decline in the price or (2) to protect a profit in a long position. Also called short position.	SLT
single-purpose prepaid card	a stored value card for which the card issuer and merchant (card acceptor) are identical, thus representing a prepayment for specific goods and services delivered by the issuer. See also prepaid card.	EM-ECB
smartcard	an integrated circuit card with a microprocessor, capable of performing calculations.	EM-Sec EM-CPSS EM-ECB
software-based products	electronic money products which employ specialised software on a personal computer and which can typically be used to transfer electronic value via telecommunications networks such as the internet.	EM-ECB
special collateral	securities that, for any reason, are highly sought after in the market by borrowers. Repo rates for these specific securities tend to be higher than the prevailing repo rate for general collateral. Also known as "special". See also general collateral.	SLT
SSS	see securities settlement system.	
stakeholder	in a payment system, stakeholders are those parties whose interests are affected by the operation of the system.	Core Principles
stamp duty	a tax in the form of the cost of stamps which are required to be affixed to legal documents such as certificates, receipts and the like.	SLT
standing order	an instruction from a customer to his bank to make a regular payment of a fixed amount to a named creditor.	Red Book Blue Book Retail
sterilisation	the use by a central bank of operations (such as open market sales) to reduce bank reserves (liquidity) which it has created through some other financial transactions such as the purchase of foreign currency.	EM-CPSS

Term	Definition	Source
stored value card	a prepaid card in which the record of funds can be increased as well as decreased. Also called an electronic purse.	EM-Sec EM-CPSS
straight through processing	the capture of trade details directly from front-end trading systems and complete automated processing of confirmations and settlement instructions without the need for rekeying or reformatting data.	OTC
straight through processing	the completion of pre-settlement and settlement processes based on trade data that is manually entered only once into an automated system.	SSS
stress testing	the estimation of credit and liquidity exposures that would result from the realisation of extreme price and implied volatility scenarios.	ETDC
subcustodian	where one custodian (eg a global custodian) holds its securities through another custodian (eg a local custodian), the latter is known as a subcustodian.	SDF
substitution	the substitution of one party for another in respect of an obligation. In a netting and settlement context, the term typically refers to the process of amending a contract between two parties so that a third party is interposed as counterparty to each of the two parties and the original contract between the two parties is satisfied and discharged. See also novation.	Red Book Blue Book
substitution	the substitution of one party for another in respect of an obligation. In the context of a futures or options clearing house, the term usually refers to the interposition of the clearing house as buyer to the seller of a contract and seller to a buyer.	ETDC
substitution	recalling the securities lent from a borrower and replacing them with other securities of equivalent market value during the life of the lending.	SLT
supervision of financial institutions	the assessment and enforcement of compliance by financial institutions with laws, regulations or other rules intended to ensure that they operate in a safe and sound manner and that they hold capital and reserves sufficient to support the risks that arise in their business.	Core Principles
surcharge fee	transaction fee set by an ATM owner and paid directly by the cardholder to the ATM owner for the cost of deploying and maintaining the ATM.	Retail
survivors pay	loss-sharing arrangements which, in the event of a participant's inability to settle, require losses to be borne by the surviving participants according to some predetermined formula.	Core Principles
swap	an agreement for an exchange of payments between two counterparties at some point(s) in the future and according to a specified formula.	OTC
SWIFT	Society for Worldwide Interbank Financial Telecommunication: a cooperative organisation created and owned by banks that operates a network which facilitates the exchange of payment and other financial messages between financial institutions (including broker-dealers and securities companies) throughout the world. A SWIFT payment message is an instruction to transfer funds; the exchange of funds (settlement) subsequently takes place over a payment system or through correspondent banking relationships.	Red Book Blue Book

Term	Definition	Source
switch fee	transaction fee set by the network organisation and paid by the card issuing institution to the organisation for the cost of routing transaction information.	Retail
symmetric cryptography	a set of cryptographic techniques in which devices share the same secret key in combination with algorithms. For encryption, the same key is used for encrypting and decrypting, and the decrypting algorithm is the reverse function of the encrypting algorithm.	EM-Sec
systemically important payment system	a payment system is systemically important where, if the system were insufficiently protected against risk, disruption within it could trigger or transmit further disruptions amongst participants or systemic disruptions in the financial area more widely.	Core Principles
systemic disruption	events whose impact has the potential to threaten the stability of the financial system, by transmission from one financial institution to another, including through the payment system. See also systemic risk.	Core Principles
systemic risk	the risk that the failure of one participant in a transfer system, or in financial markets generally, to meet its required obligations will cause other participants or financial institutions to be unable to meet their obligations (including settlement obligations in a transfer system) when due. Such a failure may cause significant liquidity or credit problems and, as a result, might threaten the stability of financial markets.	Red Book Blue Book EM-CPSS ETDC OTC
tamper-evident	the capacity of devices to show evidence of physical attack.	EM-Sec
tamper-proof	the proven capacity of devices to resist all attacks.	EM-Sec
tamper-resistant	the capacity of devices to resist physical attack up to a certain point.	EM-Sec EM-CPSS EM-ECB
TARGET	Trans-European Automated Real-time Gross settlement Express Transfer: the TARGET system is defined as a payment system composed of one RTGS system in each of the countries which participate in stage three of EMU and the European Central Bank (ECB) payment mechanism. RTGS systems of non-participating countries may also be connected, provided that they are able to process the euro alongside their national currency. The domestic RTGS systems and the ECB payment mechanism are interconnected according to common procedures ("interlinking") to allow cross-border transfers throughout the European Union to move from one system to another system. See also interlinking.	Blue Book
TCP/IP	transmission control protocol/internet protocol: a set of commonly used communications and addressing protocols; TCP/IP is the de facto set of communications standards of the internet.	EM-Sec
telematics	the combined use of data processing and data transmission techniques.	Red Book Blue Book
teller's cheque	see bank draft.	Red Book Blue Book
term transactions	transactions with a fixed end or maturity date.	SLT

Term	Definition	Source
tiering arrangement	an arrangement which may exist in a funds or securities transfer system whereby participants in one category require the services of participants in another category to exchange and/or settle their transactions. See also direct participant/member, indirect participant/member, settling participant/member.	Red Book Blue Book
time stamp	a value inserted in a message to indicate the time at which the message was created.	EM-Sec
title transfer	conveyance of the ownership interest in property from one counterparty to another. Title transfer is used as one of the methods for collateralisation. The title transfer method employs an outright transfer of the ownership interest in property serving as collateral, ie the collateral provider transfers title to or ownership interest in the assets given as collateral against an agreement that the collateral taker will return the equivalent assets in accordance with the terms of their agreement.	OTC SLT
total return swap	an OTC swap with a fixed maturity, in which a dealer agrees to receive the total return on the shares of stock sold to the cash investor, counterparty of the swap, and in exchange to pay a floating rate of interest for the maturity to the counterparty. Payment to the cash investor at the termination of the swap is therefore the floating rate of interest plus any fall in the share price or minus any rise in the share price; on the other hand, the cash investor sells the shares to get back his investment in the market. The end result of this arrangement is that the dealer borrowed cash at the floating rate for a set period of time, using his equity position as collateral. The total return swap is combined with an outright sale of stock in this way where the dealer is looking to finance an equity position, and functions economically similarly to securities lending.	SLT
traceability	in electronic money systems, the degree to which value transfer transactions can be traced to the originator(s) or the recipient(s) of the transfer.	EM-Sec EM-ECB
trade date	the date on which a trade/bargain is executed.	DVP x-border SDF
trade-for-trade settlement	the settlement of individual transactions between counterparties. See also gross settlement system.	DVP Red Book Blue Book SDF
trade-for-trade settlement system	a system in which each individual transfer order is settled separately.	DVP
trade matching	the process of matching trade details (such as number of contracts, contract month and price) submitted by the trade counterparties. The clearing house often guarantees a trade at the time it is successfully matched.	ETDC
trade netting	a legally enforceable consolidation and offsetting of individual trades into net amounts of securities and money due between trading partners or among members of a clearing system. A netting of trades which is not legally enforceable is a position netting.	DVP SDF Red Book Blue Book

Term	Definition	Source
trade registration	the process by which matched trades are formally recorded on the books of the clearing house. For clearing houses that act as central counterparties, registration may also be the time at which the clearing house substitutes itself as counterparty to the clearing members.	ETDC
transaction log	a sequential record of transactions that is stored on a device.	EM-Sec
transfer	operationally, the sending (or movement) of funds or securities or of a right relating to funds or securities from one party to another party by (i) conveyance of physical instruments/money; (ii) accounting entries on the books of a financial intermediary; or (iii) accounting entries processed through a funds and/or securities transfer system. The act of transfer affects the legal rights of the transferor, transferee and possibly third parties in relation to the money balance, security or other financial instrument being transferred.	Red Book Retail
transferability	in electronic money systems, the degree to which an electronic balance can be transferred between devices without interaction with a central entity.	EM-ECB <i>EM-Sec</i>
transfer system	a generic term covering interbank funds transfer systems and exchange-for-value systems.	Red Book Blue Book
travel and entertainment card	card issued by non-banks indicating that the holder has been granted a line of credit. It enables him to make purchases but does not offer extended credit, the full amount of the debt incurred having to be settled at the end of a specified period. The holder is usually charged an annual fee. Also called charge card.	Red Book Blue Book Retail
tri-party repo	repo in which bonds and cash are delivered by the trading counterparty to an independent custodian bank, clearing house or securities depository that is responsible for ensuring the maintenance of adequate collateral value during the life of the transaction.	SLT
truncation	a procedure in which the physical movement of paper payment instruments (eg paid cheques or credit transfers) within a bank, between banks or between a bank and its customer is curtailed or eliminated, being replaced, in whole or in part, by electronic records of their content for further processing and transmission.	Red Book Blue Book
ultimate settlement	sometimes used to denote final settlement in central bank money.	Red Book Blue Book
unwind	a procedure followed in certain clearing and settlement systems in which transfers of securities and funds are settled on a net basis, at the end of the processing cycle, with all transfers provisional until all participants have discharged their settlement obligations. If a participant fails to settle, some or all of the provisional transfers involving that participant are deleted from the system and the settlement obligations from the remaining transfers are then recalculated. Such a procedure has the effect of allocating liquidity pressures and losses from the failure to settle to the counterparties of the participant that fails to settle. Unwinds can be distinguished from debits to securities accounts that do not imply the original transfer is rescinded (eg in cases where securities are discovered to be forged or stolen).	SDF <i>DVP</i> <i>Red Book</i>

Term	Definition	Source
unwinding	a procedure followed in certain clearing and settlement systems in which transfers of securities or funds are settled on a net basis, at the end of the processing cycle, with all transfers provisional until all participants have discharged their settlement obligations. If a participant fails to settle, some or all of the provisional transfers involving that participant are deleted from the system and the settlement obligations from the remaining transfers are then recalculated. Such a procedure has the effect of transferring liquidity pressures and possibly losses from the failure to settle to other participants, and may, in an extreme case, result in significant and unpredictable systemic risks. Also called settlement unwind.	Blue Book <i>ETDC</i>
user	payment system users comprise both participants and their customers for payment services. See also customer, direct participant, direct participant/member, indirect participant/member, participant/member.	Core Principles
user fee	transaction fee set by the card issuer and paid by the cardholder to the issuing institution for card payments or ATM cash withdrawals; other user fees, sometimes called foreign fees, are paid by the cardholder to the issuing institution for the use of ATMs not owned by the issuing institution.	Retail
value-at-risk	an estimate of the upper bound on losses an institution would expect to incur during a given period (eg one day) for a given confidence level (eg 95%).	ETDC
variation margin	funds that are paid to (or received from) a counterparty (clearing house or clearing member) to settle any losses (gains) that are implied by marking open positions to market.	ETDC
velocity	the average number of times a measure of money (as captured, for instance, by a monetary aggregate) turns over within a specified period of time. The income velocity of circulation is typically calculated as the ratio of a monetary aggregate to nominal GDP.	EM-CPSS
white list	in a card-based system, a database containing the list of all authorised card numbers.	EM-Sec
wholesale funds transfer system	see large-value funds transfer system.	Red Book Blue Book
withholding tax	a tax on income deducted at source, which a paying agent is legally obliged to deduct from its payments of interest on deposits, securities or similar financial instruments.	SLT
zero hour rule	a provision in the insolvency law of some countries whereby the transactions of a closed institution that have taken place after midnight on the date the institution is ordered closed may be retroactively rendered ineffective.	ETDC

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