Payment and Settlement Systems in Finland
Payment and Settlement Systems in Finland
Foreword

An essential requirement of commerce and economic activity in general is that payments can be made easily and safely. Buyers and sellers must be able to rely on payments being effected in the agreed manner. Uncertainty acts as an impediment to economic activity. It is also important that payments can be made in a fashion which, in addition to efficiency and safety, minimizes the costs involved. Nowadays, increasingly greater demands are also being placed on the speed with which payments are made.

The significance of a reliable and efficient payment system is growing along with ongoing international integration of economic activity.

Payment systems have developed over a long period of time in response to the needs of the day. They serve different purposes, such as day-to-day household purchases, intercompany payments, the public sector's payment flows and business transactions between Finland and the rest of the world. Payment systems should be able to deal effectively with both large volumes of retail payments as well as large-value payments, where a high premium is placed on security. Increased activity in money market and securities trade in the 1980s gave rise to pressures for developing payment systems catering for the needs of such transactions.

The articles in the English edition of this publication describe payment systems in Finland as they were at the end of 1993. The tables and figures are mainly the same as those appearing in the Finnish edition. Some minor changes have been made to the text to bring it up to date. Besides a description of traditional systems, the volume includes a survey of the book-entry clearing and settlement arrangements introduced in the money and share markets in the spring of 1992. In the articles, it has been endeavoured to depict the structure and activities of different payment systems and to pinpoint areas in imminent need of development. The aim of the publication is to provide an overall picture of Finland's payment and settlement systems and thereby increase general knowledge of their workings.
The editorial committee for this publication comprised the following persons: Ralf Pauli, adviser, who chaired the committee, Raimo Hyvärinen, head of department, Ossi Leppänen, head of department, and Veikko Saarinen, head of office, who acted as secretary. The committee would like to thank all those experts from the Bank of Finland, the Finnish Bankers' Association, banks, exchanges and the Securities Association who contributed to the preparation and writing of the articles appearing in this volume. The names of the authors are mentioned at the beginning of each chapter.

Veikko Saarinen was responsible for editing the publication. The English edition was translated in the Bank of Finland's Translation Office, and the typing, word-processing, graphs and figures were done in the Bank's Publication Office.

Helsinki, December 1993
Ralf Pauli
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Payment Systems:
Overview and Prospects

Ralf Pauli

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1 General features of payment systems

Broadly understood, payment systems embrace all the methods, instruments and technical arrangements by which payments are effected. Thus, in a general sense, payment systems comprise both payment media and transfer systems of various kinds.

Only a cash transaction is an immediate and irrevocable payment. All other payment media and methods of payment require some arrangement for the transaction to be completed. True, a cheque that has been accepted can be passed on to somebody else, in other words it can be used directly as a means of payment. And if it were to start circulating permanently without anyone presenting it to a bank for payment it would function as a payment medium in the same way as cash.

The money issued by the central bank is, however, the only legal tender in the sense that everyone must by law accept it as payment. By contrast, no-one need accept, say, a cheque in settlement of a debt. As a person who, for example, has accepted a cheque cannot be sure that he will be able to use it subsequently as a means of payment, he must have the opportunity to present the cheque for payment and, ultimately, to exchange it for cash.¹

Cashless payment media involve an order for the transfer of funds held in accounts whereby the account holder authorizes his bank to debit his account for the amount indicated.² If the account of the payee is in a bank different from that of the payer, the bank which has received the order to transfer funds forwards the details of the transfer to the other bank. In addition, the payer’s bank has to credit the payee’s bank with an amount corresponding to that indicated in the payment order, i.e. to transfer funds to that bank.

Most payments require the transfer of funds between banks. Interbank funds transfers can be made directly on a bilateral basis (correspondent bank method) or through a third party. The third party can be a bank specializing in this function, a clearing centre or the central bank. All of these methods are or have been applied in Finland.

In Finland, interbank funds transfers in settlement of payments — payment clearing — take place in two stages. In the first stage, each bank calculates the claims and liabilities arising from its customers’ payments

¹ See the article by Eriksson and Kokkola.
² See the article by Hirvonen et al.
vis-à-vis each of the banks participating in the clearing. These calculations, broken down by bank, are then transmitted via terminals to the Bank of Finland, which executes the transfers of balances by debiting and crediting the accounts of the participating banks at the Bank of Finland. The vast bulk of payments are still cleared and settled daily in this way.³ Banks belonging to the savings and cooperative banking groups settle payments within their own group through their respective central banking institutions. Payments to banks outside the group are settled via the relevant central banking institution at the Bank of Finland.

Separate clearing centres are becoming the predominant organizations for handling the clearing and settlement functions associated with securities transactions. In Finland, transactions in money market instruments are cleared and settled at the Helsinki Money Market Center Ltd (HMMC), which began operating in the spring of 1992. The HMMC calculates the delivery and payment obligations between the various parties acting as intermediaries in transactions; the actual payments take place across accounts maintained at the Bank of Finland.⁴ Similarly, payments pertaining to share transactions are being separated from other payment flows along with the step-by-step transfer of shares to the book-entry system that started in the spring of 1992. The Central Share Register of Finland Co-Operative and the Helsinki Stock Exchange are responsible for the book-entry registration system and the clearing and settlement of book-entry transactions.⁵

A centralized service has for long been used between domestic banks in Finland for the clearing and settlement of markka payments related to foreign trade. Union Bank of Finland Ltd and Kansallis-Osake-Pankki have provided this service on an alternating basis for periods of five years at a time. In early 1992, the major banks started to settle payments between themselves on a bilateral basis in an effort to speed up the clearing and settlement process and to spread the costs of operating the arrangement more evenly. The centralized service is nevertheless still provided to smaller banks against a charge.

Cross-border foreign currency payment flows are settled through correspondent banks. Most of Finland’s foreign trade payments are made in a currency other than the domestic currency. Banks effect these payments through their own correspondent banks abroad. Thus

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³ See the article by Palva.

⁴ See the article by Vehkamäki.

⁵ See the article by Kaiponen.
different national payment systems are linked together through banks’ correspondent banking networks.  

Interbank transfers of funds related to payments can be implemented either on a payment-by-payment basis as the payments arise or by applying various netting, arrangements, in which case funds transfers take place at discrete intervals. In netting, the net amounts of claims and liabilities are calculated either on a bilateral basis in relation to all other participants or, if third-party settlement is involved, on a multilateral basis, in which case each participant is left with one single obligation or claim. Multilateral netting of payment obligations is applied in transactions in money market instruments and shares in Finland.

Payment orders fall into several categories. They may take the form of an instruction by the buyer to debit his own account or an instruction by the recipient of the payment — seller — to credit his account. The user of a credit transfer (bank or postal giro) gives an instruction to his bank to debit his own account to the credit of the payee (Figure 1). A variant of this method designed to simplify the execution of payments is the direct debit, which is increasingly being used for the settlement of recurring payments, such as telephone and electricity bills and subscriptions. In the direct debit mechanism, the customer authorizes his bank to automatically debit his account to the credit of the supplier in respect of amounts in bills presented beforehand to the customer.

A cheque is an instruction to pay a stated sum of money which the remittee initiates on the basis of an authorization given by the payer. A payment card functions in the same way as a cheque in this respect. When a charge card or a credit card is used as a means of payment, the purchaser authorizes a third party — a credit card company — to debit his account. The company makes the payment to the seller.

Payment instructions are also classified according to the type of technology used in data transmission. In the case of cheques the data transmitted from the customer are paper-based, as traditionally too are data transmitted in connection with bank and postal giros. The practice of transmitting bank and postal giro transfers directly by terminal is gaining ground in Finland, though this electronic payment method still accounts for only a small part of total payments. Plastic cards do not transmit data as such; rather they identify the card issuer and cardholder and thus function as keys to the payment system.

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6 See the article by Aarnio et al.
Figure 1. Different payment methods

CASH PAYMENT
Payer ➔ Payee

BANK AND POSTAL GIROS
Payer ➔ Payment instruction ➔ Payee
Payer's bank ➔ Payee's bank

DIRECT DEBIT
Payer ➔ Authorization ➔ Payee
Payer's bank ➔ Payee's bank

CHEQUE AND BANK CARD
Payer ➔ Cheque/bank card ➔ Payee
Payer's bank ➔ Payee's bank

CHARGE AND CREDIT CARD
Payer ➔ Card ➔ Payee
Payer's bank ➔ Credit card company ➔ Payee's bank

KEY
- - - - - Funds transfer
- - - - - Authorization or instruction
- - - - - Notification
2 Payment systems as part of the financial markets

Banking essentially consists of financial intermediation and the provision of payment services. Payment services thus constitute an important part of banking business. It is hard to even imagine financial markets existing without a payment system. Indeed, the very birth of banking in the city states of northern Italy was associated with the need for payment services that arose with the expansion of commerce. Payment services based on deposits taken by moneychangers and then banks and, later, services based on lending freed parties to commercial transactions from the need for bilateral payment flows based on cash. Substantial efficiency gains were achieved by developing different kinds of payment systems.

The significance of payment systems as one of the basic pillars of the financial markets has grown as the production of goods and services has come to rely increasingly on specialization and trade. Their importance is thus being further enhanced by the process of international integration currently under way. Efficient and reliable payment flows are an essential requirement for the successful functioning of today's market economies.

The main contribution to the growth of payment flows over the past 10 to 15 years has, however, come from the rapid expansion of financial transactions, that is foreign exchange and securities transactions. This is a worldwide trend, which is partly the result of the development of new, high-speed trading systems in securities markets made possible by technological advances.

The rapid growth in the volume of payment flows in relation to other economic activity\(^7\) has served to underline the importance of the smooth functioning of payment systems. At the same time the risk of disturbances has grown. Exposure to risk has also been heightened by the faster speed at which transactions in securities markets take place and, perhaps most important of all, by the increasingly greater interdependence of economic agents, as manifested in the interlocking of payments. If, for one reason or another, either funds cannot be transmitted in the system or serious delays occur in their transmission,

\(^7\) With the exception of Japan, statistical data on long-run developments in payment flows are few and far between. In Japan, the value of payment flows, expressed as a multiple of gross national product, did not start to grow rapidly until after 1980. This ratio was estimated to be 8 in 1980 and as high as 25 in 1988. The corresponding ratio for the first decades of this century ranged from less than 5 to about 5.
this may cause liquidity problems for the recipient and, through the interlocking of payments, for other participants in the system as well. The effects of disturbances in payment flows may not be confined to the financial markets alone but may have major implications for economic activity in general.

It is precisely because of the risk of disturbances spreading to other parts of the system — systemic risk — that the authorities focus special attention on institutions providing payment services. Increasing attention is also being directed towards clearing organizations specializing in the settlement of payments. By means of special legislation, capital adequacy, liquidity and other requirements, and supervision, the authorities seek to prevent the occurrence of events that might disrupt the smooth functioning of these institutions.

The risk of disturbances cannot be completely eliminated, however; nor, indeed, does it even make economic sense to try to do so. It implies, among other things, that users of payment services should, as far as possible, always try to assess the operational reliability of institutions providing payment services. The risk of disturbances also implies that some public body, basically the central bank or a deposit insurance fund, may find it necessary to step in to support an institution that has run into difficulties so as to prevent the disturbance from having serious knock-on effects on the rest of the system.

In fact, the history of central banks is also closely related to payment flows. In many countries central banking functions came into being specifically as result of the need to create an efficient and reliable interbank payment system. Central banks themselves functioned as clearing centres or secured the liquidity of banks providing payment services. The responsibility of central banks and other authorities for ensuring the smooth flow of payments has gained increased topicality in recent years. This is due both to the rapid expansion in the volume of transactions and a shift in the banks’ operating environment from regulation to competition. During the long era of regulation banks had only limited opportunities for risk taking. While administrative control of interest rates and lending restricted the operations of financial institutions, regulation provided relatively safe bounds for their operations. The new freedoms have, however, brought with them new risks, examples of which have also been evident in Finland.

Since the late 1980s, large-value payments and their settlement have attracted considerable attention. In particular, it has been sought to lay down guidelines for the development of the clearing and settlement of securities transactions. The aim has been, on the one
hand, to facilitate cross-border payment flows and, on the other hand, to improve the reliability of payment flows. Both authorities in different countries, together with their cooperative bodies, as well as market participants and their respective cooperative bodies have investigated the matter and published recommendations.

Their recommendations concerning clearing and settlement are broadly similar; indeed, they are partly based on each other. They differ in terms of their approach to the issue and in their degree of detail. The main recommendations have become standards which are used to assess the characteristics and reliability of different systems.\(^8\)

One of the main aims of the international recommendations on clearance and settlement is to shorten the time frame for final settlement of securities transactions to three days. The ultimate aim is to achieve final settlement on the trade date. In addition, securities transactions should be settled on the basis of delivery versus payment. It is further recommended that physical securities be immobilized in a national central securities depository or replaced by a paperless system.\(^9\)

It is essential for the smooth functioning of payment flows that banks providing payment services have sufficient liquidity under all circumstances. Financial relations between the Bank of Finland and the banks together with the money market, which is where the central bank implements its monetary policy, play a vital role in the management of bank liquidity. In addition, one of the Bank of Finland’s functions — as indeed of central banks in general — is to safeguard banks’ liquidity by granting last resort financing on a temporary basis whenever necessary.\(^10\)

\(^8\) See the article by Vehmas.

\(^9\) See the article by Jauri.

\(^10\) See the article by Hasko et al.
3 Prospects

One can identify changes in both payment media and payment systems whose origins go back years or decades and which can be presumed to continue in the years ahead. Such suppositions must, however, be treated with caution as, for example, technological innovations can sometimes affect prevailing trends in the most surprising of ways.

Payment media which are inefficient in terms of costs are diminishing in importance. The use of cheques continues to decline because of the high costs associated with the operation of cheque-based systems. This is not a trend of major significance for Finland, however, as the use of cheques is already fairly limited. In contrast to many other countries the cheque never became a widely used payment instrument in Finland as an advanced credit transfer system was introduced decades ago.

Payment cards continue to grow in importance. Payment cards are developing into multipurpose cards combining several functions. In general, payments based on credit transfers can be expected to continue growing in the future at a faster rate than, for example, total output. In spite of this, the demand for cash will evidently remain greater than was estimated in the 1970s, for example, when technical progress led to the introduction of magnetic-stripe cards, automated teller machines and electronic funds transfers. In terms of numbers of transactions, cash is still used for the bulk of retail payments although it accounts for only a very small share of the total value of all payments.

The popularity of cash in retail payments is based on its general acceptance, convenience and, in some cases, its anonymity. Moreover, cash is still an inexpensive method of payment for small payments. It is often forgotten that technical facilities alone do not determine how the use of different payment media develop — their attractiveness in terms of cost is also important. Overall costs, however, do not permit one to draw very far-reaching conclusions about future developments in the relative shares of different payment media as this process is also influenced by the way in which costs or cost savings are distributed among the different parties to transactions. Hence, this is essentially a question of the division of costs between banks, shops and customers.

Although the shift from paper vouchers to electronic data transmission has reduced the costs of data transmission, these costs still make the use of an ordinary payment card for effecting small payments unduly expensive. In contrast, the prepaid card — a relatively new form of card, also known by the general name of stored value
card — radically reduces the need for data transmission associated with payments, thus at the same time making it a competitive means of payment in small payments.

Prepaid cards are 'loaded' in advance with a given amount of purchasing power (or payment units), which the cardholder can use to pay for services or goods. No credit transfers are needed in connection with transactions. The use of prepaid cards has become fairly widespread in some countries. At present, however, these cards can only be used in closed systems, ie to pay for designated services or goods. The most common examples are cards used in public telephone boxes and cards used for payment in staff canteens and various other vending machines within a given firm.

The above kinds of closed prepaid card systems are already in use in Finland and further applications are being planned, for example for the payment of parking fees. But, like other countries, Finland still lacks prepaid cards that can be used for general applications. In 1992, however, Setec Oy, the security printing house owned by the Bank of Finland, set up a subsidiary with the express purpose of developing a prepaid card of this kind. If such a card should eventually gain widespread use, the need for notes and coins would diminish significantly.

As regards funds transfer systems, several international trends can be discerned. The shift from paper vouchers to electronic entries is likely to continue and automatic data transmission and processing to expand. Large-value payments will attract more and more attention. There will be further efforts to shorten their settlement times and to improve the operational reliability of settlement procedures in other respects. It is also possible that new interbank funds transfer systems will be introduced for certain payments, thus reinforcing the trend towards specialization according to type of transaction. In Finland, the separate clearing and settlement arrangements for money market and other securities transactions are examples of this kind of differentiation.

Cross-border payments can be expected to increase over the next few years. At the moment, plans for developing settlement procedures for international securities transactions seem to be based on national centres, which would handle delivery and settlement, ie the transfer of ownership of physical or book-entry securities and related funds transfer, by mutual agreement. For other cross-border payments the future course of development could be different.

In the traditional funds transfer system for foreign currency payments, payment systems in different countries are linked together through a network of correspondent banks or through banks' own
subsidiaries or branch offices abroad, and it is the practice that the actual settlement takes place in the country that issues the currency concerned. One possibility is that international centres specializing in the settlement of foreign currency payments might be set up as rival to the present system. Settlement of foreign currency payments would then become separated from national payment systems. This would make it possible to exploit the scope for efficiency gains that exists especially when settlement is multilateral both as regards counterparties and different currencies. Development along these lines could, however, at the same time have far-reaching implications for supervision and monitoring by the authorities.

Up till now, banks have had an almost exclusive right to provide and develop payment services. Technological advances and internationalization have led to a situation where companies, as users of payment services, are perhaps starting to have an increasingly greater say than before in the development of payment systems. Companies with international operations are seeking to link payment procedures to a general system of electronic data interchange (EDI) based on universally accepted standards. The demands of users of payment services will increase interbank competition. Banks may also have to compete with non-bank entities providing payment services based on EDI.

As a rule, a country’s payment systems are linked in one way or another to a system of accounts operated by the central bank in its role as the bankers’ bank. This is also the case in Finland. In many countries the role of the central bank in the country’s payment systems is becoming increasingly important. This is associated with the perceived need to attach greater priority than before to safeguarding the smooth operation of markets and payment systems. Reflecting this concern, the Bank of Finland has seen fit to devote more resources to developing large-value payment systems by participating in their design and by providing its own current account services.

The Bank of Finland has judged it important to take international aspects and recommendations into consideration in developing new systems as Finland is becoming increasingly more deeply integrated with the member states of the European Community. In the longer term, the adoption of a single currency in connection with the implementation of Economic and Monetary Union in the EC will inevitably entail major changes in present payment and settlement systems. As yet, it has not been possible to take the need for change implied by this process directly into account in developing Finland’s payment systems.
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1 Introduction

Money fulfils three basic functions in an economy: it serves first as a medium of exchange, ie means of payment, secondly as a store of value, ie a way of storing wealth, and thirdly as a measure of value, ie unit of account. Thus, on the basis of the means of payment function, anything which is generally accepted as a means of payment can be classed as money. What then is considered to be a generally accepted means of payment? Under law, currency or cash — notes and coin — issued by the central bank has the status of legal tender. Liquid deposits, ie bank deposits which can be withdrawn immediately, are also classified as a generally accepted means of payment, and hence money, because they can be used as payment media, for example with the aid of a bank card or cheque. According to this definition, other, less liquid, bank deposits can also be classified as money. This article focuses on cash.

An essential requirement of the kind of monetary system based on fiat money which exists today is absolute trust in the ability to settle obligations in cash. This trust has been achieved by establishing an external institution — the central bank — which is ultimately founded on public financing and which has been legally empowered with the sole right to issue promissory notes that can generally be used to make payments; in other words, instruments with the status of legal tender which any bearer can use for the final settlement of debts.

In its role as a payment medium cash is unique in especially three respects: by law it must always be accepted as payment (liquidity) since a cash payment is instantaneously final (certainty); in addition, it possesses the essential attribute of anonymity. Thus the parties to a payment can remain completely unknown to each other and also to third parties; in other words the transaction is not registered in any way. Thirdly, cash does not require the support of any system in connection with the actual execution of the payment, in contrast to all other payment media, which are based on balances held in accounts. For example, in the case of a payment made by cheque, the parties rely on the services of a third party — a bank — and the payment only becomes final once the bank has transferred the necessary funds to the payee.

Next, we discuss the status of cash as legal tender, the manufacture of notes and coin and maintenance of the currency supply. We then go on to examine developments in the amount of cash in circulation, the effect of the till-money credit facility on the banks’ cash holdings and factors affecting the holding of cash by the public. Finally, we consider the future of cash as a means of payment.
2 Legal tender

2.1 Notes and coin

Under the Currency Act, legal tender comprises banknotes and coin which payees are obliged to accept in settlement of payments. The Bank of Finland has the sole right to issue these payment media. The Bank of Finland orders the necessary amounts of notes and coin from its own note-printing works — Setec Oy — and from the Mint of Finland — Rahapaja Oy — a government agency responsible to the Ministry of Finance. The Bank of Finland distributes notes and coin via its branch network primarily to the branches of other banks in accordance with their needs and receives surplus or unfit currency notes and coin returned by them.

Irrespective of their year of minting, all markka coins will remain legal tender until the end of 1993. However, the Ministry of Finance decided in 1993 to annul the validity of all the coins issued before the 1963 currency reform as well as the coins in penni denominations issued subsequently, except for those belonging to the new series introduced in 1990.

The use of coins as a means of payment was restricted by an amendment to the Currency Act in 1993. With the exception of the Bank of Finland, all payees are obliged to accept a maximum of fifty coins of the same denomination in one payment.

There are no limits on the amount of notes a payee is obliged to accept. All Finnish banknotes of the type 1986 or later types are legal tender. By virtue of the Currency Act, the Bank of Finland annulled the validity of banknotes of the types 1945—1980 at the same time as the Ministry of Finance annulled the validity of the old coins. Both decisions enter into force on 1 January 1994. From that date, payees will no longer be obliged to accept these banknotes and coins as means of payment. The Bank of Finland will nevertheless redeem these notes and coins at their current nominal value, rounded to the nearest 10 penniä, for a ten-year period starting from the entry into force of the decisions, ie until 31 December 2003.

The Currency Act contains regulations on the validity of torn notes and worn coins. The Bank of Finland is obliged to redeem a torn note at its full face value if more than half of the note is left.
2.2 Right of note issue

In Finland, the issue of markka-denominated notes is governed by provisions contained in the Act on the Bank of Finland. These provisions define how the current right of note issue is calculated. The right of note issue refers to the maximum amount of markka-denominated notes that the Bank of Finland is entitled to keep in circulation at any one time. The unused right of note issue is the right of note issue less the amount currently in use, i.e., notes in circulation and liabilities payable on demand. At the end of 1991, the right of note issue stood at FIM 33.7 billion. Of this amount, FIM 15.6 billion was in use so that the unused right of note issue amounted to FIM 18.1 billion (Table 1).

Table 1. Calculation of the unused right of note issue

<table>
<thead>
<tr>
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<th>31 Dec 1990 million FIM</th>
<th>31 Dec 1991 million FIM</th>
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<tbody>
<tr>
<td>Gold</td>
<td>2,180</td>
<td>2,180</td>
</tr>
<tr>
<td>Special drawing rights</td>
<td>791</td>
<td>932</td>
</tr>
<tr>
<td>IMF reserve tranche</td>
<td>783</td>
<td>1,136</td>
</tr>
<tr>
<td>Convertible currencies</td>
<td>33,478</td>
<td>29,381</td>
</tr>
<tr>
<td>Tied currencies</td>
<td>75</td>
<td>34</td>
</tr>
<tr>
<td><strong>Right of note issue (1)</strong></td>
<td><strong>37,307</strong></td>
<td><strong>33,662</strong></td>
</tr>
<tr>
<td>Notes in circulation</td>
<td>13,399</td>
<td>13,306</td>
</tr>
<tr>
<td>Liabilities payable on demand</td>
<td>1,495</td>
<td>2,269</td>
</tr>
<tr>
<td><strong>Used right of note issue (2)</strong></td>
<td><strong>14,894</strong></td>
<td><strong>15,575</strong></td>
</tr>
<tr>
<td>Unused right of note issue (1−2)</td>
<td>22,413</td>
<td>18,087</td>
</tr>
</tbody>
</table>

The right of note issue reflects the notion prevailing during the era of the gold standard concerning the provision of cover for notes in circulation. This is done by tying the maximum amount of notes in the first place to the Bank of Finland's holdings of gold and foreign claims denominated in foreign currency.

According to the Act on the Bank of Finland, the right of note issue may if necessary be augmented by the following items:

1) a sum of FIM 1,500 million, which can be further increased by decree for a maximum of FIM 300 million for a prescribed period;
2) domestic bills with a remaining maturity of not more than three months and for the payment of which at least two firms of good financial standing are responsible.

As a means of regulating notes in circulation the rules governing note cover are a remnant of the gold standard era, when the central bank stood ready to redeem notes in gold on demand. These rules are outdated under the pure paper money standard that prevails today.

2.3 Liability for coinage

There are no restrictions on the amount of coins in circulation and no regulations on cover for the coinage. The Bank of Finland orders coins from the Ministry of Finance. Rahapaja Oy (Mint of Finland), which became a state-owned company from the beginning of 1993, strikes the necessary amounts. The Bank of Finland purchases coins from the state at face value and puts them into circulation and receives them from its customers at face value. The Bank returns damaged coins and coins withdrawn from circulation in connection with the introduction of a new coin series to the Mint at face value.

The liability for coinage lies with the state as it has to redeem coins presented to it at face value. The state earns 'seigniorage' on coinage as it receives an interest-free loan from holders of coin; coins, as too banknotes, are obligations of the issuer. At the end of 1992, the total amount of coins in circulation stood at FIM 1 299 million.

2.4 Status of commemorative coins

The first commemorative coin was issued in Finland in 1951. Up to the end of 1993, a total of 21 different commemorative coins had been issued, each issue comprising between 35 000 and one million pieces. In all cases the precious metal used has been silver, except for the gold commemorative coin issued in late 1992 on the occasion of Finland's 75th anniversary of independence. This was the first gold commemorative coin to be issued in Finland and was in the denomination of FIM 1 000.

The lowest face value of the commemorative coins issued so far has been FIM 5 and the highest FIM 1 000. The issue of commemorative coins is prescribed by decree. Coins have been issued to commemorate some special event or an anniversary, 14 for various
anniversaries and 7 for sporting events. Proceeds of some of the issues have been used to support a particular project or activity.

The state is responsible for commemorative coins in the same way as it is for other coinage. At the end of 1992, commemorative coins in circulation amounted to FIM 257 million.

Commemorative coins have very seldom been used as means of payment. People who have acquired them have tended to keep them as souvenirs. The numismatic value of most commemorative coins has not risen to any significant degree because the numbers struck have been fairly large.

3 Manufacture of notes and coin

3.1 Planning and design

During the period of independence, the entire note series has been completely redesigned on three occasions: in 1922, 1955 and 1986. Modifications in the colouring and design of notes without any change in the basic appearance of the series have been more frequent. The appearance of the notes was left unchanged in connection with the 1963 currency reform but the denominations of the notes were only one-hundredth of what they had been before the reform.

The planning and implementation of the 1986 note series lasted more than five years. The planning got under way in 1981 and the new notes were issued in 1986 and 1987. Two factors of prime importance in the planning of banknotes are security features and artistic considerations. The committee set up to make proposals on the design of the new series considered that the pictorial themes of the existing notes lacked uniformity and that the best solution would be to start planning an entirely new note series.

With major advances in photocopying and image processing technology and the increasingly widespread availability of such equipment, the threat of counterfeiting has grown. In redesigning notes in different countries increasing attention has been paid to their security and to verifying their authenticity. These factors were taken into account in planning the 1986 series but because of the rapid pace of technological advance new notes incorporating even more sophisticated security features were issued in 1991.

Notes are increasingly being withdrawn from deposit accounts via ATMs and cash dispensers and notes can also be used for payment in
vending machines of various kinds. This is placing ever growing demands on the printing of notes and their authentication features so that misuse can be prevented.

The Bank of Finland is responsible for the planning, implementation and printing of banknotes. The Parliamentary Supervisory Board decides on the designs of the new notes while the Bank’s Board of Management decides on the descriptions of the notes, which are published in the statute book. The notes are printed on the presses of Setec Oy, a security printing works owned by the Bank of Finland, in accordance with the Bank’s requirements. Setec Oy sells notes to the Bank of Finland at their market price and the Bank of Finland has the sole right to put notes into circulation.

The introduction of a new coin series also started in the late 1980s. The basic appearance of the 50, 20, 10, 5 and 1 penni (from 1952 to 1962 markka) coins had remained unchanged. The current 1 markka coin dates from the 1960s and the 5 markka coin from the 1970s. In the late 1980s, a uniform series of coins was judged desirable and so the entire series was redesigned. The new coins are being introduced in two stages: the 50 and 10 penni coins were put into circulation in 1991 and the 1, 5 and 10 markka coins in 1993.

3.2 Security features

The use of notes and coin as payment instruments rests on payers and payees being able to reliably verify that they are genuine. Consequently, payment instruments should be widely known to the public and incorporate authentication features which make them easily recognizable but at the same time difficult to forge. Thus increasing attention has been paid to the security of payment instruments — particularly notes — both in Finland and abroad, although counterfeit notes are a rarity in Finland.

The notes of the 1986 series put into circulation in 1991 possess several new authentication elements which ensure that the notes are readily identifiable both optically and by machine. The most important of these are the watermark, the security thread, the kinegram or the latent image, microprinting and intaglio printing. The Bank of Finland and the banks have conducted campaigns to inform the public about the notes’ security features.

Counterfeiting of coins is a far smaller problem in economic terms. It is largely confined to the use of foreign coins and tokens in slot machines.
3.3 Denominations

After the implementation of the currency reform on 1 January 1963, the currency in circulation in Finland consisted of 100, 50, 10, 5 and 1 markka notes and 50, 20, 10, 5 and 1 penni coins (Tables 2 and 3). With the subsequent fall in the value of money and rise in manufacturing costs, 1 000 and 500 markka notes have been put into circulation and the 5 and 1 markka notes have been replaced by coins. The 20, 5 and 1 penni coins have been withdrawn from circulation. In late 1993 the 10 markka note was replaced by a coin and the 20 markka note was introduced.

The last few years have witnessed some shifts in the distribution of the notes in circulation by denominations. The share of the 1 000 markka note initially rose sharply after it was put into circulation in 1986 but the rate of increase has levelled off since 1988. The use of the 500 markka note has diminished markedly in relative terms and this trend is likely to continue in the future. In contrast, the 100 markka note has retained its large share. This is attributable to ATMs and cash dispensers, which operate almost exclusively on the basis of 100 markka notes. The relative shares of the 50 and 10 markka notes in the notes in circulation have been declining continuously (Table 2).

Before the introduction of the new coin series, which started in 1991, developments in the relative shares of the value of the coins in circulation were marked by an increase in the share of the 5 markka coin and a decline in the shares of all other coins. After 20 and 5 penni coins ceased being put into circulation towards the end of 1990, the shares of the 50 and 10 penni coins started to increase. At the end of 1992, 28 per cent of the 50 penni coins in circulation and 22 per cent of the 10 penni coins were still coins of the old series. It is estimated that less than half of the 5 penni coins, about half of the 10 penni coins, more than 60 per cent of the 20 penni coins and over 70 per cent of the 50 penni coins will be returned to the Mint (Table 3).
Table 2.  
Notes in circulation, 1963—1991

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<td>Mill. FIM</td>
<td>%</td>
<td>Mill. FIM</td>
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### Table 3.

**Coin in circulation, 1963–1991**

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*Other* includes all other denominations.
Table 3. (continued)

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</table>

*) Other = 1 penni coins plus commemorative coins.
3.4 Wear and life of notes and coin

The quality of the notes put into circulation by the Bank of Finland is considered to be very good, and so they can be used without difficulty in automats of various kinds. The neat and harmonious appearance of the notes is also widely held to be important. The highest denomination notes are handled with more care in transactions and they have a longer average lifespan than smaller denomination notes. Whereas the 1 000 markka note lasts about ten years and the 500 markka note five years, the 100 markka note lasts two years or so and the 50 markka note one year. The 10 markka note has an average life of eight months.

Wear and tear of coins is minimal and of no consequence as regards maintaining the supply of coins.

4 Maintenance of the currency supply and handling of cash at the Bank of Finland

4.1 The Bank of Finland’s branch network and maintenance of the currency supply

Managing the country’s currency supply continues to be one of the central bank’s key tasks. The carrying out of this task has required the maintenance of a nationwide branch network.

The Bank of Finland’s branches were established to handle the country’s regional currency supply at a time when the transportation of notes and coin was slow and difficult and money was handled manually. Beginning in the mid-1980s, money-handling equipment employing new technology, such as note-sorting machines and coin-packing machines, were installed at the branches. New, more advanced note-sorting machines were installed at the Kuopio, Tampere and Turku branches in 1990 and at the Oulu branch in 1991. Two of these machines are in operation at the head office, the first having been acquired in 1985.

In connection with the acquisition of the new equipment, the branches at which the note-sorting machines had been installed began to take over the currency distribution tasks of the other branches as the
capacity of the six machines was sufficient to meet the demands of the entire country. The change is of fairly little significance for the banking sector and maintenance of the currency supply as a whole as these five offices are able to supply the entire country as quickly as the thirteen offices were able to do so previously. The task of the other eight branches would have been limited to distributing and receiving currency in the cities where they were located. However, it was not judged expedient to maintain branches for this purpose alone. Accordingly, the Parliamentary Supervisory Board decided to close the Joensuu, Mikkeli, Pori and Rovaniemi branches by the middle of 1992 and the Jyväskylä, Kotka, Lahti and Vaasa branches by the middle of 1994.

4.2 Note sorting and handling of coin

Banks return their surplus notes to the Bank of Finland. The notes are bundled together and counted in the banks' branches before being despatched to the Bank of Finland. At the Bank, the notes are inspected for three reasons: first, to detect possible counting errors; secondly, to enable the sorting of the notes into those which are fit for reissue and those which are unfit for reuse and must be destroyed; and thirdly, to check the authenticity of the notes.

The Bank switched to automated note-sorting and counting procedures in the second half of the 1980s. Initially, two types of machine were used for sorting, but since the beginning of the 1990s, the bulk of notes has been sorted by large, multipurpose machines.

Initially, only 10 markka notes were sorted by machine; later, 50 and 100 markka notes also began to be sorted by machine. Since 1988, the number of notes sorted by machine has exceeded the number sorted manually. Manual sorting will disappear almost entirely over the next few years (Table 4).

As regards coins, coin-packing machines are operated in places where large amounts of coins are handled. Up until a few years ago, rolls of coins were packed by hand in cardboard boxes but in the late 1980s, machines were introduced which pack the rolls of coins in plastic wrap. This facilitates and expedites the handling of coins, particularly in places where large amounts of coins are packed, for example at the Bank of Finland's branches.
<table>
<thead>
<tr>
<th>Year</th>
<th>1000 markka</th>
<th>500 markka</th>
<th>100 markka</th>
<th>50 markka</th>
<th>10 markka</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>By hand</td>
<td>By machine</td>
<td>By hand</td>
<td>By machine</td>
<td>By hand</td>
<td>By machine</td>
</tr>
<tr>
<td>1986</td>
<td>0</td>
<td>-</td>
<td>13.0</td>
<td>-</td>
<td>161.9</td>
<td>-</td>
</tr>
<tr>
<td>1987</td>
<td>2.2</td>
<td>-</td>
<td>11.4</td>
<td>0</td>
<td>96.3</td>
<td>57.8</td>
</tr>
<tr>
<td>1988</td>
<td>3.1</td>
<td>-</td>
<td>10.5</td>
<td>0.1</td>
<td>63.3</td>
<td>111.9</td>
</tr>
<tr>
<td>1989</td>
<td>3.6</td>
<td>-</td>
<td>9.3</td>
<td>0.1</td>
<td>46.3</td>
<td>150.7</td>
</tr>
<tr>
<td>1990</td>
<td>4.8</td>
<td>5.7</td>
<td>6.3</td>
<td>6.4</td>
<td>17.0</td>
<td>192.2</td>
</tr>
<tr>
<td>1991</td>
<td>0.6</td>
<td>3.4</td>
<td>1.7</td>
<td>7.7</td>
<td>6.9</td>
<td>239.8</td>
</tr>
</tbody>
</table>
4.3 Destruction of unfit notes and coin

Notes which, because they are worn or soiled or otherwise damaged, are unfit for reissue are sorted from those that are fit for further circulation. Unfit notes are destroyed. After a new series of notes has been introduced, notes of the old type are not recirculated for very long as their use alongside the new notes causes difficulties in ATMs, for example. This has led to major changes in the numbers of notes withdrawn from circulation (Table 5).

Table 5. Notes withdrawn from circulation, 1987–1991, million FIM

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1000 markka</td>
<td>9.7</td>
<td>101.5</td>
<td>231.0</td>
<td>296.0</td>
<td>250.0</td>
</tr>
<tr>
<td>500 markka</td>
<td>566.9</td>
<td>2364.5</td>
<td>1 190.5</td>
<td>475.0</td>
<td>325.0</td>
</tr>
<tr>
<td>100 markka</td>
<td>2 505.0</td>
<td>2 930.0</td>
<td>1 261.9</td>
<td>1 945.0</td>
<td>1 681.9</td>
</tr>
<tr>
<td>50 markka</td>
<td>177.5</td>
<td>1 370.0</td>
<td>1 269.0</td>
<td>832.5</td>
<td>637.8</td>
</tr>
<tr>
<td>10 markka</td>
<td>506.0</td>
<td>822.3</td>
<td>1 071.9</td>
<td>613.5</td>
<td>517.5</td>
</tr>
<tr>
<td>5 markka</td>
<td>0.5</td>
<td>0.3</td>
<td>1.3</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>1 markka</td>
<td>0.0</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
<td>—</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3 765.7</td>
<td>7 588.7</td>
<td>6 025.6</td>
<td>4 162.3</td>
<td>3 412.5</td>
</tr>
<tr>
<td><strong>No. of notes, millions</strong></td>
<td>80.5</td>
<td>143.9</td>
<td>158.1</td>
<td>98.8</td>
<td>82.3</td>
</tr>
</tbody>
</table>

The stocks of coins held by the Bank of Finland in its vaults are used to meet differences between the demand for coins in payments and the annual production of coins. Whenever necessary, the Bank replenishes its stocks by ordering coins from the Mint. The removal of unfit coins from circulation has no significance in this respect. In contrast, the phasing out of the existing coin series and its replacement by a completely new series will necessitate the withdrawal of large quantities of coins from circulation over the next few years. The Bank removes these coins from circulation, delivers them to the Mint and is paid for them by the state at their face value.

The number of coins withdrawn from circulation began to grow in 1990 (Table 6) when new 50 and 10 penni coins were put into circulation. 5-penni coins ceased to be necessary when, in the same year, sums were rounded to the nearest ten penni for payment purposes. Likewise, 20-penni coins began to be withdrawn from circulation towards the end of the year, and a coin in this denomination is not included in the new coin series.

<table>
<thead>
<tr>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>100 markka</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3 090</td>
</tr>
<tr>
<td>50 markka</td>
<td>1 320</td>
<td>1 100</td>
<td>1 060</td>
<td>-</td>
<td>1 815</td>
</tr>
<tr>
<td>25 markka</td>
<td>-</td>
<td>15</td>
<td>518</td>
<td>-</td>
<td>55</td>
</tr>
<tr>
<td>10 markka</td>
<td>-</td>
<td>-</td>
<td>572</td>
<td>-</td>
<td>70</td>
</tr>
<tr>
<td>5 markka</td>
<td>130</td>
<td>134</td>
<td>134</td>
<td>144</td>
<td>240</td>
</tr>
<tr>
<td>1 markka</td>
<td>174</td>
<td>131</td>
<td>156</td>
<td>183</td>
<td>13 311</td>
</tr>
<tr>
<td>50 penni</td>
<td>21</td>
<td>16</td>
<td>17</td>
<td>9 384</td>
<td>41 000</td>
</tr>
<tr>
<td>20 penni</td>
<td>18</td>
<td>14</td>
<td>17</td>
<td>3 313</td>
<td>30 030</td>
</tr>
<tr>
<td>10 penni</td>
<td>7</td>
<td>6</td>
<td>7</td>
<td>2 189</td>
<td>10 715</td>
</tr>
<tr>
<td>5 penni</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>948</td>
<td>5 592</td>
</tr>
<tr>
<td>1 penni</td>
<td>221</td>
<td>78</td>
<td>53</td>
<td>38</td>
<td>82</td>
</tr>
<tr>
<td>Total</td>
<td>1 896</td>
<td>1 500</td>
<td>2 539</td>
<td>16 199</td>
<td>106 000</td>
</tr>
</tbody>
</table>

4.4 Automation of cash handling and implications for maintenance of the currency supply

Up to the 1980s, the counting of notes and their sorting into those fit for and those unfit for recirculation was largely a manual task. The 1980s saw the appearance on the market first of equipment suitable for counting and sorting small amounts of notes and later equipment requiring fairly large amounts of notes. Because of the capital expenditure involved and the staff needed to operate such equipment, the efficient handling of notes requires larger units than was the case with former methods. This development has led to a reduction in the number of the Bank of Finland’s branches as they have had relatively few other tasks.

The fees charged by banks for the handling of cash have prompted firms that handle large quantities of cash to start packing coins themselves to some extent.

In its currency distribution activities, the Bank of Finland focuses on dealings with large customers, ie predominantly banks, the satisfaction of whose needs is best suited to the central bank’s tasks. At present, the Bank of Finland does not charge fees for its currency distribution; rather these services are provided to the banks mainly free
of charge. In accordance with the law governing payment principles applied in government charges, the trend in public administration is for costs of services to be transferred to their users, and hence the services provided free of charge by the Bank of Finland are likely to diminish in the future.

The automation of cash handling procedures reduces the costs of maintenance of the currency supply but at the same time it generates pressures for centralizing currency distribution services. Because of the capital tied up in processing equipment, there is a minimum number of times that, for example, ATMs must be used before they become profitable. The costs of producing currency are borne by the Bank of Finland (notes) and the state (coin). Up till now, users of services have either not been charged at all or, at least, only in part for the costs of these services.

5 Currency in circulation

Under the Currency Act, notes and coin — ie currency (cash) issued by the central bank — are legal tender (Chart 1). However, bank deposits, ie deposit money, are also used as a medium of exchange in payments. They can be combined with notes and coin to form different monetary concepts — monetary aggregates — which are the broader the greater the number and illiquidity of different types of deposit that are included in them. Currency is thus part of total liquidity in the economy. For example, the share of currency in the narrow measure of money, M1, which comprises currency held by the public plus deposits in cheque, postal giro and transaction accounts, was about 7 per cent on average in 1991.

Neither currency in circulation nor the broader aggregates have been target variables in the monetary policy conducted by the Bank of Finland, ie the central bank has not actively sought — either directly or indirectly — to influence the amount of currency in circulation. Supply has been entirely demand-determined; in other words, the issue of notes and coin of different denominations corresponds entirely to the demand of the private sector.
A key characteristic of currency is that it is non-interest-bearing; notes and coin are zero-interest debt instruments issued by the central bank. Thus, currency is — on the basis of the central bank’s currency-issuing monopoly — interest-free credit from the private sector to the central bank, or, conversely, currency in circulation is interest-free central bank debt to the private sector. A benefit — seigniorage — accrues to the central bank from this credit which is equivalent to the cost of alternative financing (market rate of interest multiplied by amount of credit). Seigniorage arises from the fact that the central bank can finance interest-bearing claims with interest-free debt. Seigniorage is one of the central bank’s main sources of funding. However, in Finland the costs incurred by the private sector as a result of holding cash (the income foregone in relation to holding wealth in other forms — such as bank deposits — plus the fall in value caused by inflation) are very small by international standards. This is mainly because the amount of cash in the hands of the public in Finland is small (Figure 2). The costs of the banking sector were further reduced with the introduction in 1980 of a special arrangement called the till-money credit facility.1

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1 For further details, see "Pankkitoiminnan lähtökohdat kansainvälisessä kilpailussa", Suomen Pankki A:77, 1990, pp.135–141 (in Finnish).
Currency is considered to be put into circulation on the day when the Bank of Finland releases it and the receiving bank’s current account with the Bank is debited with a corresponding amount. Notes and coin which have been put into circulation are transported to the banks and from there they are passed on to the public through cash withdrawals.

6 Banks’ cash holdings and the till-money credit facility

6.1 Readiness to meet cash withdrawals

Banks keep notes and coin in their tills to meet cash withdrawals by the public from deposit accounts. By functioning in this way as a channel for the distribution of cash the banks fulfil a key task in the maintenance of the country’s currency supply.

However, the holding of cash involves interest and other costs, which the banks seek to minimize. During the era of financial market regulation the banks were usually in debt to the central bank. By decreasing their cash holdings at the end of the business day the banks could reduce the size of their central bank debt and the associated
interest costs. In practice, the banks did this by transporting as large a part of their cash holdings as possible to the Bank of Finland at the end of the day. At the Bank, their current accounts were credited with the relevant amounts, thus reducing the size of the outstanding debit balances on their accounts at the end of the day. On the morning of the following business day, cash would then be collected from the central bank and transported back to the banks’ branches.

6.2 Aims and mode of operation of the till-money credit facility

The daily transportation of cash to and fro between the banks and the Bank of Finland was cumbersome, and it involved a security risk. To avoid such unnecessary transportation of cash, an arrangement called the ‘till-money credit facility’ was introduced at the beginning of November 1980. In addition, the Bank of Finland judged it expedient that cash supplies should be dispersed throughout the country as a precaution against a possible disruption in distribution channels or some other crisis.

The till-money credit facility took the form of an interest-free loan by the Bank of Finland to the banks equivalent to their daily cash holdings. Thus, the banks no longer incurred interest costs as a result of holding cash.

In practice, till-money credit was — until the end of November 1990 — based on reports on the amounts of their cash holdings (till-money reports) which the banks submitted daily to the Bank of Finland. The banks’ current accounts at the Bank of Finland were credited with these amounts. The amount of credit was linked each day to the banks’ cash balances and thus it was no longer possible to influence a bank’s position at the Bank of Finland by transporting cash.

The procedure whereby the unnecessary transportation of currency to and fro between the banks and the central bank in Finland was terminated was probably unique in the world. Central banks in some other countries have attempted to reduce the unnecessary transportation of currency by lowering the interest costs associated with holding cash. In these countries banks’ are allowed to deduct cash holdings from the non-interest-bearing (cash) reserves they are required to deposit at the central bank.
6.3 Changes in the facility

In the early 1980s, the till-money credit facility did not lead to any noticeable increase in the amount of cash held by banks in their tills in relation to, for example, the amount of currency in circulation. In 1984, however, the banks' cash holdings started to grow significantly, and by the end of 1988 they were four times higher than they had been at the beginning of 1984 (Figure 3). As this coincided with the deregulation of the financial markets and the transformation of the banks' net liability to the central bank into a net claim, it was decided to reduce the subsidy to the banks associated with the arrangement. This was done by setting a 'base amount' for each bank's till-money holdings. The credit facility did not apply to the base amounts and so from then on the banks had to finance this part of their till-money holdings themselves.

The aggregate base amount was set to correspond to the banks' normal cash requirements before the till-money credit system was introduced. It was estimated to be equivalent to 13.3 per cent of the total amount of currency held by the public. The aggregate base amount was then divided up among the banks in proportion to the amount of deposits held with them in transaction accounts (personal cheque, savings and deposit accounts). The new arrangement came into effect on 1 August 1988. The base amounts were subsequently revised in 1989, 1990 and 1991 (Figure 3).

Figure 3. Bank's cash holdings and the base amounts under the till-money credit facility, million FIM

1 Banks' cash holdings
2 Of which: base amounts, ie amounts which banks have to finance themselves
In connection with the 1990 revision, another important change was made to the till-money credit facility. Up to that time, the banks had notified the Bank of Finland of the amount of their till-money credit for each business day on the following day. The credit was nevertheless booked at the Bank of Finland for the accounting day, i.e. the day before. This practice of booking credit retroactively hampered to some extent the management and monitoring of liquidity. Therefore, largely for this reason it was decided to modify the system by extending credit for one month at a time in an amount which was equal to the average of each bank’s actual cash holdings in the previous month. New till-money credits based on monthly averages became effective on the last day of the following month. The principle underlying this procedure was the same as that applied to the banks’ cash reserve deposits with the central bank. Another reason for the change was that the Bank of Finland was planning to introduce a real-time interbank funds transfer system in spring 1991, and did not want to book items retroactively in the new system.

6.4 Significance of the facility

With the adoption of the till-money credit facility, the costs which banks incurred as a result of holding cash balances diminished substantially, and this remained true even after the base amounts were introduced. The low costs associated with holding cash were one factor enabling the banks to build an extensive network of ATMs. In relation to population, Finland’s network has, since 1987, been the world’s densest after Japan’s. The exceptionally rapid growth in the number of ATMs in the period 1984–1988 — and in the amount of cash needed to operate them — was probably the main reason why the banks’ till-money holdings (including ATMs) increased so sharply during that period (Figure 4).

As a result of the exploitation of the till-money credit facility and the growth in the number of ATMs, the banks’ cash holdings came to account for an increasingly large share of the total currency in circulation. At the end of 1988, about one-third of the total currency in circulation was in banks’ tills; this share was some three times higher than for 25 other countries studied in an international comparison.²

The till-money credit facility was of no significance for monetary policy as the credit granted to banks under the arrangement was linked to their cash holdings and hence could not be misused to expand bank lending. Till-money credit had a 'one-off' effect on bank liquidity in connection with the introduction of the facility and the base amounts and subsequently once a month after the changeover to monthly reporting.

6.5 Termination of the facility

In connection with the revision of the base amounts in 1992, it was decided to further reduce the subsidy to the banks associated with the till-money credit facility. This was done by setting the aggregate base amount at 20 per cent of the total amount of currency held by the public, as against 13.3 per cent previously. Thus, the shares of the base amounts increased by 50 per cent as compared with the preceding period.

The till-money credit facility was introduced in 1980 so as to rationalize the handling of cash and to avoid the unnecessary transportation of cash. But in the decade or more since the facility
started to operate, the arrangements for maintenance of the currency supply have been changed fundamentally, with the result that the daily transportation of cash between the banks and the Bank of Finland on a large scale is no longer meaningful from the banks' point of view. As, moreover, it was desired to alter the financing relations between the Bank of Finland and the banks to better correspond to the prevailing operational environment, the Bank of Finland decided to discontinue the facility at the end of June 1993.

With the termination of the facility, the holding of cash by the banks once again entails a marginal cost which acts as an incentive to minimizing such holdings. For this reason, the banks are expected to adapt to the new circumstances by decreasing their cash holdings by as much as they can.

7 Cash holdings of the public

7.1 Use of cash in payments

Although in terms of numbers most payments in the economy are made using cash, such payments represent but a fraction of the total value of payments. Cash is usually used for making small-value payments. Because of the anonymity of cash, it is difficult to determine precisely what proportion of all payments is made in cash. Large-value payments are typically effected using means of payment which are linked to bank deposits, ie cheques, bank drafts, payment cards and credit transfers.

To meet future cash payment needs — both expected and unforeseen — the public, ie households and corporate entities (other than deposit banks and the central bank), hold cash balances. The amount of cash held by the public at any time, ie the demand for cash, depends on the total amount of transactions in the economy, on developments in the price level and interest rates and on how cash is used in general as an instrument for making payments.

Mathematically, the demand for money can be expressed with the aid of, for example, the following equation describing the demand for real cash balances: $M/P = a*y - b*i + c$, where $M$ is the stock of money, $P$ is the price level, $M/P$ is real cash balances (ie the effect of changes in the general price level on purchasing power has been taken into account), $(y)$ is a variable depicting economic activity (such as gross domestic product) and $(i)$ depicts the level of interest rates. The
coefficient (a) measures the income elasticity of real demand and (b) its interest rate elasticity. The term (c) describes the effect on the demand for money of other factors, such as technological development of the payment system and financial innovations. The equation indicates that a rise in the level of economic activity (y) increases the demand for money. By contrast, a rise in the level of interest rates (i) decreases the demand for money (the sign of the coefficient (b) is negative).

7.2 Effects of payment technology on the demand for cash

The proportion of all payments made with cash actually depends in practice on the competitiveness of non-cash payment technology, i.e., on the supply of alternative payment methods and their pricing. For example, the rapid proliferation of various types of payment cards in the second half of the 1980s demonstrates that this kind of payment medium was highly competitive in relation to other payment media (including cash). Thus payment cards have been a factor reducing the relative share of cash in payments and thereby also the demand for money.

On the other hand, the rapid spread of ATMs, from which cash can be withdrawn round the clock, has boosted the use and competitiveness of cash. This has happened primarily by improving the availability of cash since an ATM can be thought of as a new service outlet for a bank. Improved availability has, in turn, lowered the costs of using cash.

As a result of the expansion of the service outlet network, i.e., of the combined sum of traditional bank offices and ATMs, it is estimated that the public now withdraws smaller sums than before from deposit accounts but at more frequent intervals. With the reduced need to hold cash, there has been a decline in the relative amount of cash balances held by the public, which, in turn, has increased the velocity of circulation of the currency held by the public over time. Conversely, the expansion of the service outlet network has entailed the relative and absolute growth of cash balances held in banks' tills and a slowdown in the velocity of circulation of these balances (Figure 4).
Figure 5. **The 1990 bank strike and the demand for cash**

![Graph showing the demand for cash in 1990](image)

1. Currency in circulation
2. Currency held by the public

Figure 6. **Currency held by the public in relation to the value of private consumer spending in selected countries, %**

![Graph showing the currency held by the public](image)

1. Japan
2. West Germany
3. Norway
4. France
5. Finland
6. Iceland
Non-cash payment media must be backed by a well functioning support system, i.e. banking system. These payment media actually function as authorizations for the transfer of funds, whereby a bank transfers funds from the payer’s to the beneficiary’s account. As far as the parties to the payment are concerned, the payment is final only when the bank has credited the beneficiary’s account. By contrast, a payment made with cash is final immediately. Consequently, the demand for cash tends to increase rapidly whenever a disturbance occurs in the payment system. This is because the availability and acceptability of non-cash means of payment decrease sharply when the disturbance occurs, and may cease altogether if the disturbance is prolonged. This happened, for example, in connection with the labour dispute in the banking sector in January–February 1990. As people withdrew cash in anticipation of the strike the amount of currency in circulation almost doubled in the space of one week, even though Postipankki (and hence partly also the postal giro system) was unaffected by the dispute (Figure 5).

One of the indicators traditionally applied in measuring the efficiency of the payment system is the ratio of the amount of cash held by the public to some macroeconomic variable. In Finland, this ratio is one of the world’s lowest, and measured in this way Finland’s payment system has for decades been one of the world’s most advanced (Figure 6). The postal giro system was inaugurated in Finland as long ago as 1939 and the bank giro system soon after in 1942. Employers have been paying their employees’ wages and salaries directly into bank accounts since the 1960s, and as a result most people of working age nowadays have their own bank account. In addition, Finland has a very dense network of bank branches covering the entire country. These factors have created ideal conditions for the use of payment media based on bank deposits in making payments.

7.3 Distribution of cash by denominations

Another factor that influences the demand for cash to some extent is the distribution of cash by denominations, i.e. the numbers and face values of different notes and coins in use. The more optimal this distribution is the fewer notes and coins are needed for making payments. If, for example, only 30 penni coins and 7 and 820 markka notes were in circulation, the situation would be quite senseless as far as cash transactions are concerned. For this reason, it is endeavoured to attain a distribution of denominations which is as even as possible and in which the denominations are divisible by each other.

Thus the denominations of the notes and coins in circulation should correspond to the requirements imposed by cash transactions. With
changes in the purchasing power of money over time, there may also be
changes in the distribution by denominations. For example, as the value
of money decreases, a new unit of currency with a denomination higher
than those previously in use may be put into circulation.

Similarly, the decline in the value of money may mean that at some
point of time it becomes expedient to replace the note with the lowest
denomination by a coin. This was done most recently in Finland in 1993,
when the issue of the 10 markka note was terminated. Prior to this, the 5
markka note had been replaced by a coin in 1984 and the 1 markka note
by a coin in 1964. With the decline in the value of money, the lowest
denomination coins eventually become unnecessary. When this happens
the issue of the coins is discontinued and those still in circulation are
withdrawn, as in the case of the 1 and 5 penni coins.

The share of the outstanding stock of coins in the total value of
notes and coin in circulation has remained virtually constant at between 8
and 10 per cent since the beginning of the 1970s. A special feature worth
noting, however, is the large share (20–23 per cent) of commemorative
coins in the total amount of coins in circulation during some periods
(Figure 7). These coins, which though they are included in the stock of
coins, are not used in payments, have traditionally had relatively high
denominations: 5–1 000 markkaa depending on the year of issue.

Figure 7. Share of commemorative coins in the
total value of coins in circulation, %

![Graph showing the share of commemorative coins in the total value of coins in circulation from 1975 to 1990.]

1 Date of issue of 1 markka coin
2 Date of issue of 5 markka coin
Figure 8. Shares of different notes in the total number of notes in circulation, %

MK = markka

Figure 9. Shares of different notes in the total value of notes in circulation, %

MK = markka
Figure 10. Shares of different coins in the total number of coins in circulation, %

MK = markka
P = penni

Figure 11. Shares of different coins in the total value of coins in circulation, %

MK = markka
P = penni
The shares of different notes in the total number and value of notes in circulation are shown in Figures 8 & 9. The shares of different coins in the total number and value of coins in circulation are likewise shown in Figures 10 & 11.

The increase in the demand for money resulting from a disturbance in the payment system may effect different denominations in different ways. The distribution of notes by denominations during such a disturbance will probably differ from that prevailing under normal circumstances as cash is then likely to be used to make payments — such as wages and salaries — that would usually be made through the banking system.

For example, there was a marked shift in the composition of notes during the 1990 bank strike: the share of the two highest denomination notes grew at the expense of the three lowest denomination notes. The most pronounced change was the shift from the 100 markka note to the 1 000 markka note (Figure 12). A point worth noting here is the dominant position of the 100 markka note. This is because ATMs operate almost exclusively on the basis of this particular note.

Figure 12. **Shares of different notes in total notes* in circulation in the last quarter of 1989 and during the 1990 bank strike**

![Graph showing share of different notes](image)

MK = markka

1. Average for the last quarter of 1989
2. Bank strike

* Excluding 1 and 5 markka notes
8 Future of cash

One of the main aims of European integration is the adoption of a single currency. This is scheduled to take place in the late 1990s, that is, after the countries participating in economic and monetary union in Europe have set up a common central bank and permanently locked the exchange rates between their currencies. Implementation of the arrangement would mean the introduction of a currency unit that would serve as a means of payment throughout the Community. This would eliminate the costs accruing to firms and individuals from changing foreign currencies into local money and vice versa and facilitate the use of cash as a means of payment when travelling in Europe.

No decisions have yet been made on how the single currency will be put into circulation, its appearance, distribution by denominations etc. Consequently, we do not dwell on this subject any further here, but rather focus on considering the role of cash in domestic transactions.

8.1 Competitiveness of cash as a medium of payment

Will advances in payment technology result in cash being replaced completely by other media in payments? This is hardly likely to happen, at least over the next few decades. Many reasons can be cited for this. The most important one is the status of cash as the only legal tender, another its attribute of anonymity. Further, it should be stressed that all current means of payment that are alternatives to cash need the support of some system and that this system is prone to disturbances. To protect themselves from the risk of disturbance, economic agents are likely to continue using cash to satisfy part of their demand for payment media. It is true that a disturbance in the payment system, for example a strike in the banking sector, could also impede and even halt the distribution of cash. But the essential point here is that the public usually receives advance warning of such a dispute and can therefore take the necessary precautions.

The relative importance of cash could change significantly in the future. This would, however, depend on how its competitiveness as a means of payment develops from the point of view of the public. The long-term trend has been downward, that is, the ratio of cash to the
Gross domestic product has been declining ever since the Second World War. As a rule, payment methods change fairly slowly, if no external pressures impinge on this process. The spread of payment cards and ATMs in the 1980s exposed payment habits to a technological shock. As payment cards reduce the use of cash while ATMs increase it, these innovations more or less offset each other in terms of their combined effect. The rationalization of the banks' service outlet network now in progress in Finland could, however, undermine the competitiveness of cash if the availability of cash worsens as a result.

The most important factor affecting the extent to which cash will be used in the future is the pricing of alternative means of payment. Financial market deregulation, heightened competition, as well as the current economic recession and the resultant plight of the banking sector, have given rise to heavy pressures for banks to set the prices of payment system services in a new way. The aim is that services developed during the era of regulation and provided free of charge or at below cost should in due course be repriced so as to correspond to costs. In general, one might state that, if the prices of payment services rendered by banks rise significantly, this could increase the use of cash.

8.2 Towards electronic money

Small retail payments are made almost exclusively with cash because, for example, the minimum value set for card-based transactions is currently FIM 30–50, depending on the card issuer. This lower limit has been set so that the processing costs — data transmission, checking that there are sufficient funds in the account etc — that are always associated with a transaction based on deposits should not be disproportionate in relation to the value of the payment. The changeover to electronic data transmission has reduced these costs but the costs of low-value payments are still too high for transfers between bank accounts to be effected economically.

The bulk of the costs of maintaining the currency supply (manufacture, storage, transport etc) arises from notes and coin used in making small payments with a value of less than FIM 50. It is worth noting that notes and coin with denominations of FIM 10 and less account for the vast majority of the total number of notes and coin in circulation (96 per cent at the end of 1990), although their share in the total value is relatively small (12 per cent). The greater part of the costs arising from the maintenance of the currency supply are borne
by the central bank, the banks and the commercial sector; the share of households is limited to the seigniorage costs incurred by holding cash balances.

Because of the large currency handling and distribution costs associated with small payments, it has been endeavoured to develop alternative payment methods. The first application to gain worldwide acceptance is the prepaid card (stored value card), which functions on the principle that purchases of goods and services are paid for in advance. Thus, for example, the purchase of a prepaid card for use on buses corresponds to the purchase of a multi-journey ticket.

Outwardly, a prepaid card looks just like a bank or credit card in which a certain amount of purchasing power has been stored in advance. Technically, it can be based on either magnetic stripe or microprocessor technology. When a prepaid card is inserted into, for example, a train ticket vending machine, an electronic reading device first checks that a sufficient amount of purchasing power is stored in the card. After this, the vending machine dispenses the ticket and at the same time an amount of purchasing power corresponding to the value of the purchase is erased from the card. Depending on the technology applied, it may be possible to later reload the card with new purchasing power.

Prepaid cards are most widely used in France and Japan, but they are spreading quickly in many other countries as well. The most common areas of application are pay telephones, public transport and car parks. In Finland, probably the first prepaid card to be introduced for general use is the pay phone card issued by Post and Telecommunications.

Current applications of prepaid cards suffer the drawback that they are based on closed systems: cards issued by telephone companies can only be used in pay phones and not, for example, in public transport systems. Thus, the danger exists of several incompatible, and perhaps partly overlapping systems, emerging in the economy, with a consequent waste of resources.

A problem as regards reliability is that capital adequacy requirements applicable to banks do not cover the corporate entities operating such systems. Thus, a card system is prone to the risk that it could experience a disturbance or cease functioning altogether, if the firm operating it runs into liquidity difficulties or goes bankrupt, in which case all users of the system would lose their money.

From the macroeconomic point of view, it would be sensible if, from the very outset, universal electronic money comparable to cash could be introduced that would be in general circulation but which would not incorporate the obligation to be generally acceptable. One
option would be for the central bank to issue electronic money that would be in general circulation in the economy. Overlapping could then be avoided and at the same time the confidence felt by the public in the system would probably be greater than it would be in the alternative case of several closed systems. This is especially likely to be so if the central bank were to stand ready to redeem electronic money issued by it in cash.

In October 1992, the Bank of Finland decided to set up a company called Toimiraha Oy as a subsidiary of Setec Oy, the security printing house owned by the Bank, for the purpose of developing and inaugurating an electronic money system based on chip cards. The aim is to introduce a universal form of electronic money and thereby prevent local applications based on incompatible chip cards from gaining ground and causing unnecessary investments. In the future, it would be possible to develop the system towards one where the central bank would issue electronic money.

Regardless of whether separate prepaid cards based on closed systems or universally applicable electronic money become the dominant form, the use of cash — especially coin — can be expected to decrease.
Banks’ Payment Systems

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1 Introduction

In Finland, payments are made mainly in cash and using the payment methods offered by the banks. The banks play an important role in supplying cash to the public.

The payment methods offered by banks include bank and postal giros together with their data link applications, bank cards and other payment cards plus cheques and similar payment instruments. In addition, many other payment methods are available for foreign payments and corporate payments.

Though the volume of payments started to grow in 1920 with the enactment of the Cheque Act, the rate of expansion did not pick up momentum until 1939 when the postal giro system was introduced. In 1942, the commercial banks introduced a bank giro system, which the savings banks joined the following year. In 1948, an agreement was reached on cooperation between the bank and postal giro systems. The cooperative banks joined the bank giro system in 1950. At the end of 1991, there were some 3 050 bank branches handling the banks' payment services and some 990 post offices handling Postipankki's payment services.

Rapid advances in data processing and telecommunications technology over the last decades have had a major impact on how payments are effected and on the range of payment services supplied. The initial impetus to payments based on electronic data transmission came in the 1960s when employers started paying wages and salaries directly into employees' bank accounts. A large part of the payments between customers and banks is now based on electronic data transmission, and interbank transactions are almost completely electronic.

Cooperation between the bank and postal giro systems and standardization, including uniform clearing practices and giro reference forms, have led to rationalization and greater efficiency in the transfer of payments.
2 Bank accounts and payments

2.1 Accounts used for payments

In Finland, customers currently have a total of some 15 million accounts at their disposal that they can use for making payments. These accounts include cheque accounts, postal giro accounts and transaction accounts. Transaction accounts is the term used to describe a wide variety of personal accounts which, in addition to traditional personal cheque accounts, deposit accounts and savings accounts, includes accounts of more recent origin appearing under various names. Savings accounts can also be used for receiving payments.

2.1.1 Cheque account

Companies and other corporate entities have traditionally used cheque (current) accounts for effecting payments. Money can be paid into and withdrawn from a cheque account in a branch of the bank or bank group where the account is held by means of a paying-in or withdrawal slip, a bank card, a cheque or a bank giro order.

A credit limit — overdraft facility — can also be agreed for a cheque account. This is the pre-arranged sum of money which the bank allows the account holder to overdraw his account, i.e. run into debt to the bank. The bank charges an annual fee for the facility and interest on overdrawn amounts.

2.1.2 Personal cheque account

A personal cheque (current) account is a deposit account with a cheque writing facility. Money can be withdrawn from a personal cheque account in a branch of the bank or bank group where the account is held using a withdrawal slip, bank card, cheque or bank giro order. The account holder receives information on his personal cheque account in the form of statements, which the bank sends at agreed intervals. Funds can be withdrawn from the account free of charge up to a monthly withdrawal limit.

Personal cheque accounts are intended primarily for the management of the financial affairs of private individuals and small
firms. They may include an overdraft facility. Up till now, they have served as a general account for the payment of wages and salaries.

2.1.3 Deposit account

A deposit account is an account suitable for accumulating deposit funds. Funds can be withdrawn from a deposit account in a branch of the bank or bank group where the account is held using a withdrawal slip, a bank card or a bank giro order. Transactions in a deposit account may be recorded in bank statements or a passbook. If a deposit account is used for making payments, one based on bank statements is recommended.

2.1.4 Savings account

A passbook is always used in connection with a savings account. All debits and credits made in the customer’s account are recorded in the passbook, and the balance in the passbook indicates the amount of the account holder’s claims on the bank. Under the account terms, the passbook must always be presented when paying in or drawing out funds. In practice, however, funds can also be paid into the account without a record being made in the passbook (eg by bank giro). The bank can pay funds to the person presenting the passbook up to a pre-arranged withdrawal limit unless some limitation has been imposed regarding the right to use the account.

2.1.5 Postal giro account

A postal giro account is a payment account facility offered by Postipankki which is used in a similar fashion to cheque accounts in other bank groups. A postal giro account may also have an overdraft facility. Postal giro accounts can be opened in branches of Postipankki or in post offices.

2.1.6 Transaction accounts

Up until a few years ago, savings accounts, deposit accounts and postal giro accounts were the basic kinds of personal accounts in
Finland. The share of these traditionally tax-exempt transaction accounts has, however, declined substantially with the gradual dismantling of legislation on the tax exemption of deposits and the introduction of accounts subject to withholding tax, a final tax on interest income deductible at source.

These new transaction accounts are used by individuals for making payments, and they have neither passbooks nor chequeing facilities. They are available under a wide variety of names related to the issuing bank: eg KOP's Kansallistili, PSP's Leijonatili, UBF's Teletili, the cooperative banks' Kultatili and the savings banks' Käyttötili plus. They can be either interest bearing or non-interest bearing accounts, and funds held in them can be accessed by means of paying-in and withdrawal slips, bank giros, postal giros, cheques, bank cards, eurocheques and eurocheque cards, cash cards, and workplace or home terminals.

2.1.7 Foreign currency accounts

Domestic foreign currency account

Domestic currency accounts are resident convertible foreign currency accounts held by private persons who are Finnish residents or by Finnish companies or other corporate entities. Domestic foreign currency accounts are used for repatriating foreign exchange income or, for example, depositing foreign exchange left over after a journey. A domestic foreign currency account can be opened in any convertible currency and a separate account can be opened for each currency. The importance of the ecu, the monetary unit of the EC, has increased now that the Finnish markka's external value is expressed in terms of the ecu.

Domestic foreign currency accounts can take the form of sight accounts, deposit accounts and fixed accounts, and they are subject to the same foreign exchange regulations as other domestic accounts; foreign currency can be withdrawn from them within the limits laid down in the Bank of Finland's foreign exchange regulations and in the general account terms. With the dismantling of exchange control, there are currently no restrictions on the use of these accounts.

Convertible account

Convertible accounts are accounts held by foreign residents with domestic banks, the funds in which can be transferred abroad without limit. A convertible account can be denominated in any convertible currency and can be opened by a non-resident private person or by a
foreign company or other corporate entity. These accounts can also be opened on a temporary basis because of work or study. The funds accrued in a convertible account can be used without restriction both in Finland and abroad since the concept convertible is based on the presumption that the convertible currency funds deposited in these accounts can be withdrawn as such or transferred abroad at any time.

2.2 Payment methods related to accounts

2.2.1 Credit transfer

A credit transfer (giro) is a transfer of funds between accounts effected by bank or postal giro etc. Bank and postal giros can also be used to effect credit transfers between accounts held with different banks. The funds transferred are debited to the account of the payer and credited to that of the beneficiary (payee). For example, bank and postal giro orders and bills paid using ATMs are effected by transferring funds from the payer’s account to that of the payee. Similarly, credit transfers take place when sums are credited to accounts in connection with payments made by cheque or bank card.

2.2.2 Paying by payment card and cheque

Payments arising from the purchase of goods or similar transactions can, in addition to cash, be made using means of payment such as cheques, bank cards or other payment cards that authorize the debiting of a bank account. Payments made by bank card are debited to the cardholder’s account on the basis of the account or card number and are credited to the payee’s account once the bank receives the card vouchers.

A cheque presented at a bank for payment is paid at once to the holder, but debited to the account of the drawer only after data on the cheque has been received through data links at the account-keeping bank.

Paper vouchers, such as bank card payments, cheques and other debit vouchers related to payments, are filed in the remitting bank. The receiving bank can tell from the filing code where the original voucher is located.
2.3 Terms of accounts used for making payments

The terms of accounts used for making payments include definitions of the following: the user of the account (or users if the account holder authorizes other persons to use the account as well); the instruments that can be used in connection with the account (bank cards, cash cards, cheques, bank giros); the withdrawal limit and credit limit, if any; the rate of interest payable on credit balances, the rate of interest charged on overdrafts, the penal interest rate applied and the methods of calculating these interest rates; the payments, fees and commission payable to the bank for the use of the account; and the customer’s responsibilities, for example, in cases of misuse and loss.

3 Payment services offered to customers

3.1 Payment instrument services

3.1.1 Cash

Paying with cash (banknotes and coin) is still the dominant method of payment, although the share of bank and credit cards is rising rapidly. Cash is used particularly where minor sums are involved. Funds held in transaction accounts are the main source of cash. These funds can be withdrawn by means of a passbook, cheque, bank or postal giro, bank card or cash card. Large single withdrawals are restricted by maximum limits set on withdrawals and notice period terms applied to accounts.

3.1.2 Payment cards

Payment cards comprise bank (debit) cards, credit cards, combination (multifunction) cards, charge cards and eurocheque cards. ATM cards (including cash cards) also belong to the range of instruments that can be used in connection with bank accounts. At the beginning of 1992, Finns had about 6.6 million payment cards at their disposal (Figure 1).
Bank cards

A bank (debit) card is a card issued by a bank which is furnished with the number and specimen signature of the holder and meant only for personal use. It may also bear a photograph of the cardholder, together with his personal number, account number, date of birth or year of birth. An application for a bank card can be made to a bank by an account holder who is at least 18 years of age, who has a personal number issued by a Finnish authority and a permanent domicile in Finland and who has managed his financial affairs impeccably. Youth cards, intended for 12–17 year-olds, are also available; these can only be used for withdrawing cash from a bank or an ATM.

The bank and the cardholder agree in writing on the use of the bank card. The agreement sets out the purposes for which the card can be used, the card’s use within the limits of the funds available in the account at any time and in compliance with the account terms, the safekeeping of the card, the responsibilities of the cardholder and the bank, termination of the use of the card and the charges applied. The right of the cardholder to use an ATM to access his account is verified by means of a personal identification number (PIN). The PIN comprises a series of numbers issued by the bank for use with the card and which the cardholder undertakes to keep secret. The bank forwards the PIN to the cardholder without disclosing it to the bank’s staff.
The holder of a bank card furnished with a photograph can use the card to prove his identity when doing business in a bank or when paying by cheque. A bank card is sufficient to verify the existence of a bank account. When the holder of a bank card uses it to make a payment, he signs a bank card sales slip or an EFTPOS (electric funds transfer at point of sale) terminal voucher in the store or taps his PIN into the EFTPOS terminal.

A credit line provided by the bank or the bank’s credit card company can be combined with a bank card. Withdrawals made by bank card are debited to the cardholder’s account and credited to the payee’s account after the payment vouchers have arrived at the bank. Data on EFTPOS transactions are sent to the bank in the form of data transfers.

Company bank cards are cards issued to business enterprises for use by a designated employee. Transactions made with the card are debited from the company’s account and the company is responsible for seeing that the card is used properly.

Bank cards can also be used for withdrawing cash from banks in the Nordic countries and from banks and cash dispensers in Spain, within the limits set by the relevant interbank agreements.

Verification of payments made by bank card

Verification is the process by which the recipient of a payment in a card transaction telephones the issuing bank’s authorization service and provides them with the following information:

1. identification data on the retail outlet;
2. the customer’s card number;
3. the exact amount to be authorized; and
4. the last three numbers of the bank card sales slip.

In reply, the recipient of the payment is given an authorization code, which is entered on the sales slip. Advanced EFTPOS terminals carry out the authorization procedures automatically.

Bank card guarantee

If a bank card is checked in compliance with the instructions jointly issued by the banks, the bank guarantees to credit the beneficiary of a bank card transaction up to the currently valid maximum amount of
the guarantee, even if there are insufficient funds in the cardholder’s account or misuse is involved. The bank also guarantees to credit a bank card transaction in excess of the guarantee limit if the transaction has been duly authorized.

Credit cards

A credit card is a card which enables the holder to buy goods and services on credit and with which the user of the credit, the amount used and the place where it was used can be identified. The card contains data specifying the lender, payer and card. Credit cards can be either personal or holder cards, and both Finnish and international cards are available.

Applications for credit cards issued by credit card companies or bank-owned finance companies are made to the companies concerned either through a retailer or the bank where the applicant holds his account. Applications for credit cards issued by companies in the trade or travel sectors are made to a sales establishment or through it to a finance company. Applications for cards issued by oil companies are returned to retail outlets belonging to these companies.

The terms and conditions relating to the use of credit cards vary from card to card. Among other things, the terms define the validity of the card, the credit limit and the repayment timetable for credit. The credit period can range from 14 days to several years. The annual rate of interest applied in credit card business varies from 12 to 24 per cent. A payment made by a credit card falls due for payment in one or several instalments.

The use of credit card often involves the collection of a fee for the opening of an account (enrolment fee), a charge for handling the customer’s account, a billing charge or an annual fee. Any commission charged by the credit card company for credit card transactions is paid by the retailer. Like bank cards, most credit cards include an authorization limit for purchases.

General and special credit cards

Credit cards can be classified according to their acceptance into general and special credit cards. A general credit card can be used in any store which accepts it as a means of payment, regardless of the line of business the store is in. A general credit card is issued by a company which does not itself offer goods or services for sale.
Aktiiviraha, Credo, Kultakortti, Käyttöluotto, OK-luottokortti, Perusluotto and Plussatili are examples of such cards issued in Finland. Among the international cards that are accepted in Finland are American Express, Diners Club and Eurocard.

A special credit card (retailer card or store card) can only be used to pay for purchases in a retail outlet of the store that has issued the card and in stores operating in collaboration with it. Most of the cards issued by department store chains and companies in the oil and travel sectors fall into this category. Some Finnish cards are also accepted in retail outlets abroad (eg those issued by oil companies and major department stores) and, similarly, some foreign cards are accepted in Finland.

**Charge cards**

A charge card is a card similar to a credit card which allows the holder to charge purchases for deferred payment for a period which is equal at most to the billing period; no interest is charged. Examples of such cards are Visa and the OK card without a credit facility.

**Combination (multifunction) cards**

A combination or multifunction card is a bank card which also functions as a credit or charge card. It may, for example, be a combination of an OK or Visa card and a bank card or a bank card provided with a credit facility extended by the bank or the bank’s credit card company. The holder of a combination card can, at his option, use the card either as a bank card or a credit card. When paying for a purchase he tells the salesclerk which of the card’s functions he wishes to use.

Visa and OK combination cards can also be activated to allow the cardholder to draw money from cash dispensers and ATMs. Visa combination cards incorporating this function can additionally be used to withdraw money from Visa cash dispensers abroad. Similarly, foreign Visa cards can be used to withdraw cash in many bank branches in Finland as well as from cash dispensers operated by Postipankki and Union Bank of Finland.
ATM cards

ATM cards (including cash cards) also belong to the range of instruments that can be used to access funds held in bank accounts. They are intended solely for use in ATMs: they can be used to draw money, to transfer funds between accounts and to make balance enquiries. An ATM card does not contain personal data but is instead identified by the card number. To use the card, the holder must first tap his PIN into the ATM.

Eurocheque card

A eurocheque card is a cheque guarantee card for a eurocheque (see 3.1.3) which is issued, on application, by a bank to a personal customer and which must be presented when paying with a eurocheque in shops or when drawing money from a bank. A eurocheque card is furnished with the names of the bank and cardholder, the number of the card and of the account to be debited and the last year of validity. At present, Finnish eurocheque cards are valid for two years at a time. The use of a eurocheque card is limited by the general terms and conditions applicable to the account to which it is linked.

In addition, by using a PIN, Finnish eurocheque cards can be used to withdraw money from many cash dispensers in most European countries. At present, foreign eurocheque cards are not widely accepted in Finnish cash dispensers. Holders of eurocheque cards issued by savings banks in some European countries have access to part of the savings bank group’s cash dispenser network in Finland. Domestic eurocheque cards issued by the savings bank group in Finland can also be used in these cash dispensers.

In many countries, eurocheque cards are used for EFTPOS transactions within the country concerned, but international use of EFTPOS terminals is only at the exploratory stage. The use of eurocheques in ATMs is also becoming more widespread outside Europe.

Processing card payments in retail outlets

Card payments are processed in retail outlets either by using an imprinter or an EFTPOS terminal. When a card is processed using an imprinter, the embossed data on the surface of the card are reproduced
on the payment card voucher. At the same time, the retailer's code, name, address and banker details are transferred from the imprinter to the voucher.

The retailer then enters on the voucher the amount of the purchase, the date and his initials. If necessary, the customer's identity is checked from an identification document, and the type of document and the customer's personal number are noted on the voucher. The customer is then asked to sign the voucher. If the purchase exceeds the guarantee limit, the salesclerk also checks the transaction by contacting the bank's or credit company's authorization service. Sums less than the guarantee limit can also be verified if necessary. The authorization code given by the authorization service is noted on the voucher.

The processing of card transactions in retail outlets can be speeded up by using an EFTPOS terminal. An EFTPOS terminal is a terminal located in a store, petrol station etc in which the recognition of cards, checking of lists of cancelled cards (hot card file) and the transmission of card payments is automated. An EFTPOS terminal located at the cash desk of a store is operated by the salesclerk, while a transaction effected on a self-service EFTPOS terminal is handled by the customer. The customer either signs an EFTPOS voucher or taps his secret PIN, which is equivalent to his signature, into the terminal. EFTPOS transactions are transferred over a telephone line from the store to the retailer's bank.

3.1.3 Cheques and eurocheques

Cheques

A cheque is a document drawn up in a specified form and including the minimum information required under the 1932 Cheque Act. Part of this information is already printed on the cheque forms which banks issue to their customers. The amount must always be written on the cheque in letters and figures. If the sums are different, the sum appearing in letters is decisive. In addition, the customer must sign the cheque and furnish it with the place and date of drawing.

A cheque can be drawn for payment either by the drawer himself or by a person named on the cheque. In an open endorsement, the person on whom the cheque has been drawn endorses the cheque by writing his name on the reverse of the cheque. In a special endorsement, the cheque is endorsed to a named person. The cheque can be further endorsed by the endorsee.
When a cheque is written, there must be sufficient funds in the account on which it is drawn. A cheque must be presented for payment within 20 days from the date of drawing. A cheque can be post-dated, ie furnished with a date later than the day on which it is written, and be presented for payment prior to the date of drawing.

Crossed cheque

A cheque can also be crossed, which means that two parallel lines are drawn diagonally across the face of the cheque (endorsed to a named person) at an interval of about one centimetre from each other. The bank will only credit the amount of such a cheque to the beneficiary’s account. This ensures that a cheque to be sent, for example, by post or messenger service reaches the person to whom it is payable.

Certification of a cheque

By certifying a cheque, the paying bank can undertake to honour it if it is presented for payment within 20 days. The paying bank must indicate that the cheque has been certified by writing on it the word ‘certified’, ‘confirmed’, ‘marked’ or some other note to that effect and furnishing it with its business name. The addition of the bank’s business name alone is considered to constitute certification if the business name is on the face of the cheque.

Cover reservation for a cheque

When a cheque is presented for payment in a branch of a bank group which is different from that where the drawer holds his account, the clerk telephones the drawer’s bank to reserve cover for the cheque. The clerk at the drawer’s bank checks that there are sufficient funds in the account indicated on the cheque and sets aside funds equivalent to the amount of the cheque in the form of an ‘advance withdrawal’. In the branch to which the cheque has been presented for payment, the clerk notes on the reverse of the cheque that covering funds have been reserved, thereby ensuring that there are funds in the account at least up to the amount stated on the cheque.
Cheque guarantee

A cheque guarantee is an undertaking by a bank to honour, under certain conditions, cheques that are drawn on it and are presented for payment by another bank or some other recipient. A cheque is honoured for the full amount of the cheque, provided it does not exceed the currently valid guarantee limit. Cheques are honoured even if there are not sufficient funds in the account. The guarantee is conditional on the cheque being duly checked.

The use of cheques (including bank drafts) has been declining steadily (Figure 2). Personal customers use bank and credit cards for the vast bulk of their payments. Companies still use cheques, and the average value of these transactions is large (Figure 2).

Figure 2. **Number and average value of cheques drawn, 1987—1991**

- Number, millions
- Average value, thousand FIM

1. Number of cheques
2. Average value of cheques
Eurocheques

The eurocheque system was established by European banks in 1968. Finnish banks have been members of the system from the beginning. Initially, their participation was limited to cashing eurocheques drawn on foreign banks but since 1975 they have also been issuing eurocheques and eurocheque cards to their customers. Postipankki does not, as yet, issue eurocheque cards, though it does cash eurocheques.

A eurocheque is always used in conjunction with a eurocheque card, which acts as a guarantee card. Eurocheques are written and accepted in compliance with the rules jointly agreed by the member banks. According to these rules, the bank on which the eurocheque is drawn guarantees covering funds to the party cashing the cheque, thus avoiding the need for the latter to carry out expensive and time-consuming enquiries. Nowadays, eurocheques can be used in over 40 European and non-European Mediterranean countries. In addition to banks, they are widely accepted in hotels, restaurants, shops and other retail outlets. Eurocheques are most widely used in Germany, Switzerland and the Benelux countries, where they are also used in domestic transactions. In some countries, eurocheques are used in domestic transactions alongside other cheques. In Finland, the use of eurocheques for domestic purposes is modest, as indeed is the use of cheques in general.

Eurocheque guarantee

In Finland, banks guarantee eurocheques that have been written in accordance with instructions up to the currently valid guarantee limit. Among other things, the guarantee is conditional on a eurocheque always being presented together with a eurocheque card, on the cheque being drawn in compliance with the guarantee limits set by different countries and as a rule in local currency, and on the cheque being signed in the presence of the accepting party.

In the eurocheque system, the commission due to a bank is generally collected in connection with the cheque clearing, so that a customer drawing a cheque abroad usually receives the full amount of the cheque while the commission of both the foreign bank and the drawer’s bank is collected from the account afterwards.
3.1.4 Other payment instruments

**Tax and bus vouchers**

Tax and bus vouchers are a special payment medium used for the payment of taxi or bus fares, primarily by persons employed by business enterprises or their customers. They are used in the same way as cheques. The bank credits the beneficiary's account with the total value of the vouchers honoured by it. The tax and bus vouchers remain with the honouring bank, which then transfers the relevant debiting data electronically to other banks for the debiting of their (corporate) customers' accounts.

**Bank drafts**

A bank draft is a cheque drawn by a bank on itself against which the bank undertakes to pay a stated sum of money on demand to a named person or to his order. Bank drafts are honoured by all banks, and they are comparable to cash in all transactions.

A bank draft can be purchased in any denomination and in any bank irrespective of the customer relation. It is always payable to a named person and like a cheque it is negotiable. The holder of a bank draft can send it in payment in a letter or use it in a business transaction instead of cash.

3.2 Payment transfer services

3.2.1 Bank and postal giro systems

**Bank giro system**

The bank giro system enables funds to be transferred from a payer to a payee through a bank. Bank giro is the payment transfer service jointly operated by the commercial, savings and cooperative banks and which both persons and companies can use to handle their payments and the collection of their claims.

Payments can also be transferred through the bank giro system to the postal giro system. Figure 3 shows the number of transfers effected through the bank and postal giro systems in the period 1987–1991.
Different kinds of giro forms are used in the bank giro system in accordance with payers’ and payees’ needs. They include standard giro forms, giro forms for rent payments, bills, letters of collection, membership fees and wage and salary payments, reference bank giro forms and joint reference giro forms for transfers between the bank giro and postal giro networks.

A bank giro order is usually submitted to a bank on a bank giro form. By entering his account number and signing the giro form, the payer authorizes his bank to debit his account with the amount indicated on the form. Payment transfer orders can also be sent to a bank outside banking hours by enclosing them in a special bank giro envelope and depositing the envelope in a bank giro box. The bank giro envelopes are forwarded unopened through the banks’ own routing network to the account-holders’ branches. A bank giro envelope must, however, be delivered to a bank before payment falls due. A debit listing form enables several bank giro transfers and other payments to be effected from an account. In this case, it is no longer necessary to sign each bank giro transfer separately; rather one signature on the listing form suffices.

Payments can be made by bank giro in the form of credit transfers or as cash payments to anyone’s account in any domestic bank and also to payees who do not have a bank account. In the last-mentioned case, the bank routes the payment to the branch which is nearest to the the payee, on the basis of his address, and from where he can draw the sum remitted in cash.
A bank giro can also be effected as an express transfer; in this case, it is transferred immediately by telephone, telex or in some other equally prompt way to the receiving bank or branch, which immediately informs the payee of the transfer.

Postal giro system

The services offered by the postal giro system are similar to those of the bank giro system, and payments can be effected through the system in the form of payments into accounts, credit transfers and withdrawals from accounts. Postal giro transactions are handled by Postipankki’s own branches and by the country’s post offices. Entries to accounts are handled by payment service centres. Payments can also be transferred through the postal giro system to the bank giro system.

The basic giro forms used in postal giro are credit transfer forms, paying-in forms and withdrawal forms. There are also special forms for the payment of membership fees and rent, collections and billings, reference postal transfers and joint postal giro and bank giro reference transfers.

The debit listing form for postal giro corresponds to that used for bank giro transactions. It is used for making several payments at the same time. The aggregate sum and number of payment instructions included are noted on the listing form, and only the form is signed.

Postipankki’s postal giro envelopes serve the same role as bank giro envelopes in the transmission of payment orders, the only difference being that postal giro envelopes can be despatched by mail.

3.2.2 Transfer services offered to payers

Recurrent payments

The transfer of recurrent payments is the first electronic data-processing service to be developed jointly by the banks for their customers. It enables corporate customers to transfer wages and salaries, pensions, payments for products and other payments in one batch to several payees from their own data-processing systems to a bank’s data-processing system for crediting to payees’ accounts. A corporate customer can send all information related to its recurrent payments to its own bank, which then forwards the payments to the payees’ banks (Figure 4).
The banks see to it that the requisite funds are in the payees’ accounts on the morning of the pay day or some other specified date. Companies are required to deliver the relevant information to the transacting bank on the day preceding the specified date. The payer must ensure that the payee is sent details of each regular payment received by him. Banks do not send itemized information on regular payments to payees.

Payment service

Banks offer a bill payment service to their business customers who have large numbers of bills to pay. Under this arrangement, a firm either sends its bills to its bank as they are or delivers the payment data on the bills electronically on magnetic tape or diskette or over a telephone line. The bank takes care of the calculation of cash discounts, the writing of vouchers and the transfer of sums to the creditor’s account on the due date. As a receipt for the payment of the bills, the bank sends the payer a duly stamped payments list, which serves as voucher for bookkeeping purposes.

The procedures and data content of the bill payment service differs somewhat from bank to bank, as the banks have not developed the service jointly.
3.2.3 Transfer services offered to payees

Use of reference giros for debiting

A reference giro system is used in connection with bank and postal giro to expedite the debiting of companies’ payments. A reference giro enables the creditor to identify the customer or the bill sent to the customer by means of a reference number.

The bank and postal giro networks each have their own reference giro forms, in addition to which there is a special form for inter-network transfers. When a customer uses a form to pay a bill in a bank, the payment data are converted into machine-readable form using the reference number on the form as an identifier. The billing company does not receive a paper voucher for reference giro payments received; rather the data are transferred in machine-readable form to the payee.

Direct debit

The direct debit system is a payment procedure which enables a company (the creditor) to have bills debited through its bank direct to the payer’s (debtor’s) account on the due date. Direct debiting is based on prior authorization by the customer as well as on an agreement between the company and its bank and an agreement between the payee’s and payer’s banks. The transmission of direct debit data between the company and its bank takes place in machine-readable form. The payer’s authorization data are stored in the bank, and the existence of the authorization is checked every time a direct debit is made. The company delivers the direct debit data to the transacting bank or directly to all banks in which customers hold accounts. The banks’ data-processing systems produce a machine-readable transactions list of the debits for creditors.

The company (the creditor) notifies the payer in advance of a forthcoming debit. If the details of the debit are correct, the payer does not have to do anything. The advance notice together with the payer’s bank statement serves as the payer’s voucher for the payment effected (Figure 5).
If the payer is not prepared to accept the bill specified in the advance notice, he notifies his bank thereof by an agreed date prior to the due date, whereupon the bank does not effect the debit. The payer and the creditor settle the disagreement concerning the bill between themselves.

Instead of individual payment vouchers, the bank provides the creditor with a list of the direct debit transactions and funds transfers furnished with reference numbers. The transactions list can also be delivered electronically over a telephone line or on diskette or magnetic tape.

The direct debit system offers the payer an easy and safe way to effect payments without the need to continually refer to his bank. At the same time, the payer no longer has to go to the trouble to keep a check on when payments fall due for payment as long as he ensures that there are sufficient funds in the account to be debited. The creditor, for his part, receives data on payments effected at an appropriate time in machine-readable form by line transmission or on data media.
3.2.4 Customer information services

Bank statements as vouchers

According to a statement issued by the Accounting Board (No. 1114/27.8.1990), an entity which is legally obliged to keep books can, in lieu of separate receipts, base bookkeeping entries for transactions in bank accounts on a statement issued by the bank, provided the data included in the statement meet the requirements set for payment vouchers. On the basis of this decision, the banks have jointly devised a service called TITO (Tiliote Tositteena = Statements as Vouchers) for customers in which bank statements serve as vouchers.

This service replaces the delivery of separate vouchers to customers by a bank statement giving details of transactions in the customer’s account. A statement printed out on paper can be replaced by a one in machine-readable form containing the relevant additional data. An entity which is legally obliged to keep books and which has received a bank statement in machine-readable form must print out a paper version (hard copy) of the statement for it to be acceptable as a voucher if the entity has not been authorized by the Accounting Board to store data in machine-readable form.

All banks issue statements with similar data content to their customers. Statements are issued on a daily or weekly basis if there have been transactions in the account. They are numbered consecutively, starting from the beginning of the calendar year or the accounting year.

At the request of the Accounting Board, a bank must send a balance extract at least once a month to those of its customers receiving a statement in machine-readable form. In addition to the opening and closing balances for the period, the balance extract includes aggregated data on the value and number of transactions (credits, debits, correcting entries etc) in the account for each date of entry. The balance extract is matched with the machine-readable data in the statement.

Machine-readable transactions list

This is a service jointly developed by the banks for transferring payment data furnished with reference numbers and direct debit creditings to payees. Transactions appearing on the list are not entered into the payee’s account individually. They appear as aggregate sums in his bank statement. The payee stores the payment data received in
machine-readable form in his own bill control system (sales ledger), which identifies the payer and bill by means of the reference number and makes the necessary revisions and entries.

3.2.5 Standards for giro systems

Giro forms

The standard bank giro form is in triplicate. Various special forms are also available for the payment of rents, bills etc. Forms can also be printed to meet the special requirements of the customer or the customer can have them printed himself. All special forms must be approved by the Finnish Bankers’ Association.

The reference giro form is a joint form for use in the bank and postal giro systems. It is used by customers whose billing and control systems are computerized.

Standard forms for use in the postal giro system are in duplicate. Special forms corresponding to those used for bank giros are also available. Special forms must be approved by Postipankki.

Numbering system for bank accounts

Bank account numbers consist of a code for the bank or bank group, the branch number, a code for the type of account, the account number and a check number.

An account number can comprise at most 14 digits. Account numbers are expressed as two sequences of digits separated by a hyphen. The first part always comprises six digits while the length of the second part can vary from 2 to 8 digits. The account number’s last digit is the check number. The first six digits in the Bank of Åland’s account numbers are either 660100 or 660126.

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1 Detailed requirements for bank and reference giro forms are described in 'Pankkisiirron rakenneohje' and 'Viitesiirron rakenneohje' published by the Finnish Bankers’ Association (in Finnish). Postipankki has drawn up similar instructions for the postal giro forms.

2 The numbering system is described in detail in the manual 'Tilinumeroiden rakenneohje' issued by the Finnish Bankers’ Association (in Finnish).
Postipankki’s account numbers differ from those of the other banks in that they do not include a bank code or a branch number. They can therefore start with any digit. The last three digits of the account number are separated from the other digits by a space. The last digit is the check number. A letter code preceding the digits and separated from it by a hyphen indicates a payment service centre.

The first digit (bank group code) indicates the bank or bank group as follows:

1 = KOP (Kansallis-Osake-Pankki)
2 = UBF (Union Bank of Finland)
4 = SKOP (Skopbank and the savings banks)
5 = OKO (Okobank and the cooperative banks)
6 = BÅ (Bank of Åland)
7 = STS (STS-Bank/Siltapankki)
8 = PSP (Postipankki); the number does not appear in the account number
950 = SHB (Svenska Handelsbanken)
951 = IB (Interbank Ltd)

Reference number system

The reference number system has been developed to expedite the transfer and control of payments by companies. This service enables creditor companies to receive data from banks on incoming payments quickly and safely via their own payment control systems either in machine-readable form or as a hard copy. Separate payment vouchers are not transferred in this system.

Access to the system does not necessarily require the use of a computer by a participating company. Serial reference numbering for the payment forms used in the system can be ordered from a bank. Before sending off bills to customers, the billing company furnishes each of them with a reference number (= reference), which serves as an identifier. When a bill furnished with a reference number is paid, the payment is transferred to the account of the creditor (payee) that is used for receiving such payments.

The bank does not deliver vouchers for incoming payments to the payee, but rather transfers payment data in machine-readable form or

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3 The use of the reference number system is described in the manual 'Viitenumero maksujen valvonnassa' issued by the Finnish Bankers’ Association (in Finnish).
by line transmission at agreed intervals. For each transaction the data consist of the reference, the amount of the payment, the bank's filing code, the date of payment and the date of entry. The payee transfers the machine-readable payment data to his own payment control system (eg the sales ledger), which identifies the payment by means of the reference number and carries out the necessary checks. If the company does not have access to a computer, data on incoming payments are delivered to it as a hard copy.

The bank delivers data on incoming payments and their respective filing codes either in machine-readable form or as a hard copy. The company compares this payment data with its billing data. Any differences are cleared up with the account-keeping bank on the basis of the filing code. The data are matched with the bank statement with the aid of summary totals. The reference number meets the requirements of the Bookkeeping Act, and the use of the system output has been approved by the Accounting Board (Decision No. 349/T 84).

Bank bar code

The bank bar code\(^4\) is a code outputted on bank and postal giro forms containing the following payment data:

- payee's account number,
- amount of payment,
- reference,
- due date.

The code type used for a bank bar code is based on 'Code 128 Uniform Symbology Specification' published in April 1989 by Automatic Identification Manufacturers European. The bank bar code can be used for entering data in ATMs or bank terminals equipped with an appropriate code reader.

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\(^4\) The use of the bank bar code is described in the publication 'Pankkiviivakoodistandardi' published by the Finnish Bankers' Association (in Finnish).
4 Interbank transactions

4.1 General

Like the payment services offered by banks to their customers, interbank payment systems were developed mainly in the 1970s and early 1980s.

The member banks of the Finnish Bankers’ Association participate in the interbank payment system. Clearing is handled in the Bank of Finland interbank funds transfer system.

Technically, Finland’s interbank payment system is an efficient solution. For example, in the other Nordic countries, banks do not transfer payments bilaterally, but rather through their respective bank giro centres. The Finnish solution has been made possible by the small number of separate bank groups and the fact that all of them operate systems that are technically highly advanced.

Only a very small proportion of interbank transactions still requires the transfer of vouchers between banks. Vouchers have to be transferred mainly when the banker details are inadequate.

Cheques and other vouchers related to payments are kept in the sender bank. A filing code informs the recipient where the original voucher can be found. The payee’s voucher data (including bank giro vouchers) are transferred in machine-readable form to the payee’s bank, which forwards them to the payee.

The interbank payment system is used for transferring debittings and creditings in cases where the payer and payee are customers of different bank groups. The system is also used for the interbank transmission of information.

4.2 Creditings and debitings

Interbank creditings (including giros, reference giros, covering funds for express giros, recurrent payments, direct debit creditings to the creditor and direct debit creditings by the payer) are transferred from the payer’s bank to the payee’s bank by means of a so-called money transaction. Data pertaining to the payment (for example, customer number, bill number, due date) are transferred in the same context. The banks have agreed that funds to be credited to another bank group
must be entered in the payee's account within two business days following the debiting day.

Debitings refer to debitings of bank accounts which are transferred to creditors through a bank. Debiting can be effected on the basis of an account or a card number. Examples of debitings are cheques, direct debit requests and charge card debits.

A bank may credit a creditor's account before the payment is debited to the payer's account (for example, the redeeming of a cheque) or only after the debiting has occurred (for example, direct debit crediting). Money and information transactions are transferred daily between banks in several batches.

4.3 Information

Interbank information transactions differ from monetary transactions in that they do not involve any entries into customers' accounts or any transfer of covering funds between banks.

Information transactions are used for transferring:

- direct debit agreement and authorization data,
- register data on the payee,
- requests for clarification,
- requests for vouchers,
- other information.

4.4 Clearing and settlement

Clearing of domestic payment transactions between banks\(^5\) is handled bilaterally between each bank. Data on individual transactions are transferred daily in several batches directly from one bank to another, but aggregate payment data pertaining to the batches, so-called clearing sums (machine-readable data, POLT data\(^6\), manual data and data on the numbers and values of correcting entries), are sent to the Bank of Finland for settlement of payments. The banks are linked to

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\(^5\) See the article by Marianne Palva in this publication.

\(^6\) POLT data cover transactions that arise as a result of the use of ATMs that are used jointly by the banks, eg a cash withdrawal from an ATM of another bank group. The POLT data transmission network links different bank groups' ATM networks with each other.
the Bank of Finland interbank funds transfer system by workstations through which clearing data are transferred to and fro between the banks and the central bank.

The Bank of Finland and the banks participating in the clearing exchange have a joint agreement on clearing. Each bank also maintains a current account with the Bank of Finland for settlement of cleared payments.

The daily clearing takes place in two stages. Each bank calculates the claim or liability that has arisen from other banks’ payment transactions in respect of each counterparty.

In the second stage, the clearing banks enter clearing data showing each bank’s claims and liabilities in respect of the other clearing parties into the Bank of Finland interbank funds transfer system. The Bank of Finland credits or debits the net amounts to each bank’s account with the Bank of Finland. Settlement takes place daily at about 3.45 pm.

According to the clearing agreement, there should be sufficient funds in a bank’s current account at the end of the business day to cover any liabilities that may arise to other banks. If the final balance in the current account is positive this constitutes the call money deposit for that particular bank. If the final balance in the account is negative, the deficit is covered by a liquidity credit granted by the Bank of Finland.

The banks have agreed on the principles for transferring covering funds pertaining to different types of transaction. Depending on the type of transaction, the requisite covering funds are transferred across the banks’ current accounts with the Bank of Finland either on the day preceding the due date, on the due date or on the business day following the due date.

For example, the transfer of covering funds for recurrent payments takes place on the day preceding the due date. In the case of wage and salary payments, for example, the funds must be made available to the payee’s bank so that it can make the necessary entries to the payee’s account and thus ensure that the wages are available to the payee on the morning of the pay day.
5 Technical infrastructure of payment systems

5.1 General description

Finnish banks have been utilizing information technology ever since the late 1950s. Following the introduction in the 1960s of bookkeeping systems for deposit taking, the focus of development has been on the rationalization benefits and cost savings to be gained from the application of technology. All major bulk transactions are now handled through banks' information systems. As a result of technological progress, payments are nowadays transferred mainly over telephone lines or via electronic data transmission systems.

The handling of banking business on a self-service basis outside branches became a credible alternative for customers in the 1980s (Figure 6). Underlying this development have been, on the one hand, the lowering in the price of equipment and, on the other, the rapid growth of transactions and rising labour costs. The response to this has been to automate routine services both within banks and among customers.

The Finnish banking system is unique in so far as it operates without a centralized data transmission centre. This can be attributed to the small number of bank groups in Finland and the concentration of the banks' data-processing centres in the metropolitan area of Helsinki. The technical environment in which banks operate constitutes a challenge of its own when it comes to the further automation of banking activities. Standardization of banking operations requires banks to pay increasing attention to further developing their technical readiness for compatible payment transaction links.
Figure 6. Developments in services and data links

DEVELOPMENTS IN BANKING TECHNOLOGY

- joint POLT-ATM network
- ATMs for payment of bills
- linking of Postipankki’s and STS-Bank’s ATMs to the commercial banks’ ATM network
- cooperative and savings banks’ ATM network
- commercial bank’s ATM network
- foreign transactions linked to the SWIFT network
- cash dispenser experiment
- branches’ on-line experiment
- first bank computer


Payment and payment instrument services
postal and bank giro (1939 and 1942)
- wages and salaries direct to bank accounts
- cheque
  - reference bank giro
  - bank cards

Data-processing services for customers’ systems
- recurrent payments and bill payment services
- on-line corporate customer terminal services
  - corporate off-line transfer services
  - home terminal services
  - EFTPOS terminal services
  - initial phase of TELMO

DEVELOPMENTS IN CUSTOMER SERVICES
5.2 Distribution of cash to banks

Distribution of cash is an important part of the services provided by banks to their customers. Banks do not, however, usually hold significant amounts of cash in their vaults. Rather, they endeavour to estimate cash needs on a daily basis and to hold a minimum amount for each day.

Daily orders for cash are transferred through the banks’ cash systems to the respective bank’s or bank group’s data-processing centre from where they are forwarded in machine-readable form to the Bank of Finland. The Bank of Finland then delivers the cash to the branches in the course of the business day following the ordering date.

5.3 Banks’ data-processing systems

Banking business essentially consists of the processing of information in which customers’ account transactions, other orders and enquiries are handled in a bank or between banks. The most important area of application as regards banks’ data-processing systems is the management of customers’ accounts, the necessary information for which is obtained from branches or from customers’ self-service terminals.

The infrastructure made up by the banks’ data-processing systems comprises numerous different sub-entities through which an individual bank branch is linked to other branches in Finland or abroad. The technical basis of the banks’ electronic distribution network and the core of the production of services are made up of a vast array of computers and terminal systems together with their system software and of the telecommunications networks combining them.

The data systems of each bank group’s data-processing centre are connected through data networks with all the bank group’s other information systems: via the bank’s own internal data network with the bank’s branch systems and self-service machines; via the interbank data network (POLT-ATM network and batch transmission network) with domestic banks; via the SWIFT network with foreign banks; and via general telephone and data networks with other interest groups and customer systems (Figure 7).
5.3.1 Data-processing centres

Most of the banks' data-processing centres are located in the metropolitan area of Helsinki. The Bank of Åland's centre is located in Mariehamn while Postipankki's payment transfer operations are divided among three regional payment centres in Helsinki, Tampere and Oulu. The data-processing and data-transmission techniques of each Finnish bank have evolved in their own way, and the technical solutions differ markedly from bank to bank. However, they share some features in common.

The banks' first information systems were introduced in the 1960s and were based on large mainframe computers. These made possible the automation of previously labour-intensive basic routines. Vouchers pertaining to transactions effected in branches in the course of the day were sent to the bank's data-processing centre where they were converted en masse into machine-readable form and entered in accounts as batch operations during the following night.

In the 1970s, data capture terminals were introduced in branches. These enabled transactions to be converted into machine-readable form in the branch where the transaction was initiated. Towards the end of the decade, counter terminals with on-line links to the bank's computer were installed in branches, and they were later joined by mini- and microcomputers.
In connection with the technical reorganization that started in the 1980s, local minicomputers, computer terminals and counter terminals were linked to the respective bank group’s main internal network, thus forming a decentralized data-processing system covering the bank’s entire operating area (Figure 8).

In the 1990s, efforts have been made to locate an ever-increasing part of the operations pertaining to preprocessing as close as possible to the user and the point where transactions are initiated, ie in branches’ workstation or self-service systems. The banks’ central systems handle large customer registers and data stores as well as the basic operations and applications based on them. Decentralized departmental and branch systems handle various cashier functions related to payment data and other preprocessing and expert applications, such as, for example, investment and financial advice.
5.3.2 Self-service machines

Banking services for private customers largely consist of personal service, supplying banknotes and providing payment services. It is estimated that over 80 per cent of the bulk services provided daily by banks could be automated or handled on a self-service basis. The mechanical distribution of banknotes was automated more than ten years ago. The first self-service equipment, which was installed in the mid-1970s, consisted of cash dispensers that were separate from other activities. ATMs of the type currently in use with on-line links to customers’ account data were introduced in the early 1980s.

Towards the end of the 1980s, note-dispensing cash machines were joined by self-service machines that were capable of paying bills and printing out bank statements. The range of services has subsequently been complemented by ATMs that exchange foreign currencies and count and dispense coins. In addition, banks’ self-service branches are equipped with self-service terminals that dispense information.

Self-service machines continue to be used mainly for withdrawing money and for making balance enquiries. With the exception of cash-dispensing ATMs, other ATMs were not in joint use before 1993. However, the banks have recently concluded bilateral agreements providing for the joint use of ATMs for making credit transfers and paying bills.

The number of ATMs grew rapidly in the 1980s as a result of interbank competition (Figure 9). About 2,000 new machines were installed in 1985–1989. At the beginning of 1992, there were altogether nearly 3,000 ATMs. The number of ATMs per head in Finland is the second highest in the world after Japan. Regionally, the highest number of ATMs is in the three most densely populated provinces of southern Finland.

ATMs have quickly gained the acceptance of customers and their use has been increasing steadily (Figure 10).

In the late 1980s, some Finnish bank groups made agreements with the European banks with whom they cooperate on the basis of which the cards of the contracting parties banks can be used reciprocally in the ATMs of the other parties.
Figure 9. **Number of ATMs, 1987–1991**

Cash-dispensing ATMs

Other ATMs

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1. Cash-dispensing ATMs
2. ATMs for making credit transfers
3. ATMs for printing statements

Figure 10. **Use of ATMs according to type of transaction, 1987–1991, million transactions**

Withdrawals and enquiries

Credit transfers and statements

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1. Withdrawals
2. Enquiries
3. Credit transfers
4. Statements
5.4 Data links between customers and banks

Banking services are increasingly being used directly through customers’ own data systems or banks’ self-service terminals. The range of services offered varies from bank to bank, and services are expanding all the time. The exchange of data in machine-readable form reduces both the customer’s and the bank’s overlapping working routines and the number of mistakes occurring at work. The use of electronic banking services is not dependent on time or place. The customer can handle his banking transactions at a time that is convenient for him, irrespective of the bank’s business hours. Figure 11 describes the distribution channels for banking services that can be accessed by means of data transmission links.

Data links between corporate customers and banks can be handled by means of magnetic tapes, on-line links or batch transmission. Private customers can access services in real time through on-line terminals or push-button telephones. Automated services offered by the banks through their own networks are primarily aimed at private persons. Services can also be accessed abroad via international telecommunications networks.

Figure 11. Electronic distribution channels for banking services
In order for a customer to be able to make use of the services offered by banks, he must first make a service agreement with a bank. In addition, he needs a computer, a telephone connection and a modem or some other link to the telecommunications network, and a communications program. The accounts to be used in the service are laid down in the service agreement. Besides the customer’s own transaction accounts, any accounts the customer is entitled to use can be included. The services which the customer is entitled to use depend on the authorization specified in the service agreement contract and registered in the bank’s service system.

Apart from the technical facilities referred to above, the use of banking services requires separate customer codes and security devices. The codes are customer- and bank-specific and so the customer may have several different banks’ codes at his disposal. A service may require special banker software tailored to the needs of the customer. Banks distribute software and security devices to their customers once the service agreements have been made. Information on software suitable for the use of the service can be found in the service manuals distributed by banks to their customers. In addition, a communications program suitable for the use of the service can be obtained from the supplier in connection with the purchase of a modem.

5.4.1 Data media

The transmission of data by means of magnetic tapes is the oldest way of transferring data between corporate customers and banks, and was standardized by the banks in the 1970s. Magnetic tapes are still used for transmitting large amounts of data, but their use is declining with the switch by customers to direct data transmission links.

5.4.2 Batch transmission

Services based on batch transmission were introduced in the early 1980s when the traditional method of sending data on magnetic tapes was automated by means of electronic data transmission links. The systems operate in accordance with a message-based request-reply principle, i.e. the customer sends the data to be transmitted to the bank’s own mailbox in the information system and collects the data transmitted to him by the bank from his own mailbox.

The data to be transmitted are entered in advance into the information system’s data medium. After the service link has been established, they are then transmitted from the data medium to the the bank’s system, routed by the service request file.
From the bank’s systems, the data are transferred in a corresponding fashion to the data medium of the customer’s system, routed by the customer system’s service-request file. The data received are transmitted by means of separate programs to the customer’s own financial management software. The data are handled in banks as separate batch runs in accordance with the payment transaction schedules existing between the central systems and the banks.

In off-line batch transmission services, data transmission links are opened on the initiative of the customer, and they remain open only for the duration of the transmission of the pre-agreed data batches. The link time in off-line batch transmission is short because all the data to be sent are transmitted between the bank’s and the customer’s information systems automatically, routed by the command file. An off-line link does not allow the bank the same flexibility in customer service as an interactive link. For example, the sending of occasional notifications to the customer through batch links is virtually impossible (Figure 12).

5.4.3 Company terminals

The company terminals currently in use in Finland were introduced in the late 1970s. They are technically advanced terminals offering the customer interactive services via an on-line link to the bank’s service system. The customer can increase the efficiency of his operations by means of this service if his terminal system includes applications enabling the handling of data to be sent to or received from his bank.

Some banks’ systems also allow batch transmission to be started during the period the interactive service link is open. The customer can then benefit from both the flexibility offered by the interactive links and the efficiency of batch transmission.

5.4.4 EFTPOS terminal systems

The EFTPOS terminals currently in use in Finland are based on off-line batch transmission systems. For example, an EFTPOS terminal may take the form of an application linked to a retailer’s cash desk system or an independent application which stores customers’ card transactions in the memory of a computer linked to the cash desk terminal, from where they are transmitted to banks for debiting to customers’ accounts (Figure 13).
Figure 12. Structure of the batch transmission system

Figure 13. Technical infrastructure of an EFTPOS system
An EFTPOS terminal identifies a credit card inserted into it on the basis of the data stored in the card’s magnetic stripe. When a transaction by card is made, the terminal checks that the card is one of the types accepted by the retailer and the validity of the card. In addition, the terminal checks that the card is not on the list of cancelled cards (hot card file). If the sum to be debited exceeds the verification limit for card purchases, the terminal automatically makes a verification enquiry to the authorization centre of the card issuer.

Under an agreement between the banks, the retailer can send all transactions made with payment cards issued by banks to the bank where he holds his account. The account-keeping bank then forwards the data on payments made with other banks’ cards to the respective issuers. Thus, it is not necessary for the retailer to contact each card issuer separately.

The first EFTPOS terminals were introduced in Finland in 1985. After an initially slow start as people became accustomed to them, the number of terminals has quickly increased. The use of EFTPOS terminals is forecast to go on growing rapidly in the 1990s. At the beginning of 1992, there were 33 500 retail outlets equipped with card-readers (Figure 14).

Figure 14. Developments in the number and use of EFTPOS terminals

<table>
<thead>
<tr>
<th>EFTPOS terminals</th>
<th>Number of EFTPOS transactions, millions</th>
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<tr>
<td>1987</td>
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<td>1990</td>
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<td>1991</td>
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</table>

1 EFTPOS terminals
2 EFTPOS transactions
5.4.5 Terminal banking services for private customers

Private customers can use terminal banking services either at their place of work or at home. Access to the service requires an agreement between the customer and the bank. The provision of terminal bank services at the place of work is usually based on an agreement between the bank and the employer.

The services offered to private customers are mainly character-based interactive terminal services. Services are available for IBM, videotex and ASCII terminals (ASCII = American Standard Code for Information Interchange).

The use of terminals at home and at work for self-service banking is still in its infancy. Statistics indicate that the real breakthrough in the use of these services occurred in 1990, and their use is expected to expand rapidly in the 1990s. Contributing to this will be the TELMO project for the development of a general data network (for details see 5.4.7).

5.4.6 Push-button telephone services

Some banks provide home banking services that the customer can access using a push-button telephone. The service makes use of a voice synthesizer linked to the bank’s computer. Service transactions proceed step-by-step in the form of a dialogue with the bank’s computer. The customer taps in numerical data over the telephone and the bank’s computer gives a spoken reply and requests further details if necessary. The customer can, on the basis of the same agreement, access services handled both by a home terminal and telephone.

5.4.7 TELMO — general data network

In 1989, a project for the development of a general data network called TELMO (TELematic MUltiservice network) was launched in Finland. The banks are also participating jointly in this project. The aim of the project is to develop the standards and procedures necessary for achieving a data network that is uniform in respect of its methods of application and the services provided. In addition to other service functions, it is planned to link to the data network banking, payment and insurance services which users of the network will be able to handle from their homes.

The TELMO standards are made up of numerous recommendations, which in many respects differ from the banks’ current procedures. A
factor hampering the adoption of the TELMO standards in banking services is the banks' current rather large customer base, which would have to be served in the same way as the customers have been used to hitherto, irrespective of the data transmission medium.

5.4.8 Developments in customer numbers

Following the major advances in information technology and telecommunications networks in the 1980s and the accompanying fall in prices, the use of information technology in data transmission between customers and banks expanded rapidly. The increase in the use of data transmission links has been particularly rapid among corporate customers. With the fall in the prices of hardware and software, private customers and increasingly smaller companies have started to use data links in their banking services. At the beginning of 1992, there were 277 000 customers who were using banks' data transmission links (Figure 15).

5.5 Interbank data transmission links

Domestic interbank data transmission links consist of two separate systems: the POLT network (Banks' On Line Data Communications Network) linking different banks' ATMs and the batch transmission network for transmitting bulk transactions. International payment links are handled by the SWIFT network.

5.5.1 POLT network

The first ATMs designed for joint use were introduced in Finland in the early 1980s when the commercial banks' ATM network came into operation. Later, the cooperative and savings banks established their own joint network. Up till the 1990s, there were two separate ATM networks. The present joint ATM network covering all the banks came into being when the banks agreed on combining the two separate networks with effect from the spring of 1990.

The banks' ATMs are linked to each bank's own data systems. The data systems handling different banks' ATMs are linked with each other through the POLT system. When a customer uses an ATM the data are transmitted in real time through the data network to the customer's bankers (Figure 16).
Figure 15. Developments in data transmission links, numbers in 1000s

<table>
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<th>Year</th>
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1. Line transmission connections (batch transmission)
2. Corporate customers’ terminal connections
3. Home terminal connections (incl. push-button telephones)
4. EFTPOS terminal connections

Figure 16. POLT data communications network

1 STS-Bank merged with KOP (Kansallis-Osake-Pankki) at the end of November 1992. For the meaning of the abbreviations, see 3.2.5.
5.5.2 Batch transmission network

Ever since banks began using computers, interbank payment data have been transmitted between banks on magnetic tapes. The contents of data transmitted between banks were standardized by the banks in the early 1970s.

Transporting a magnetic tape is a cheap and quick way to send data between banks, for, with the exception of the Bank of Åland, which is located in Mariehamn, all the banks' data-processing centres are located in the metropolitan area of Helsinki. Because of the automation needs of the data-processing centres and the growth in the volume of payment data, the banks combined their payment transaction systems in the late 1980s by establishing direct bilateral communications links in which the transmission of payment data is processed in the form of batch transfers. Thus, a batch transmission network was created between the banks (Figure 17). The Finnish branch of Svenska Handelsbanken and Interbank joined the batch transmission network in 1992.

Figure 17. Batch transmission network

1 STS-Bank merged with KOP (Kansallis-Osake-Pankki) at the end of November 1992. For the meaning of the abbreviations, see 3.2.5.
5.5.3 SWIFT network

An initiative by certain international banks for creating a joint telecommunications system led to the establishment of the SWIFT telecommunications network (Society for Worldwide Interbank Financial Telecommunication) in Belgium in 1973. The system became fully operational in 1977. Nowadays, nearly 3,000 banks in over 60 countries transmit more than one million messages a day through the system around the clock. The messages are transmitted between banks in real time.

With the aid of the SWIFT network and the services offered by it, international payments, statements and other banking-related transactions can be handled on a global basis.

The Finnish banks use SWIFT for transmitting international payments. If a payment message cannot be sent through the SWIFT system, instructions are sent by telex. At present, Kansallis-Osake-Pankki takes care of the national connection to the SWIFT system in Finland.

ATM networks in different countries are undergoing pan-European integration following agreements by which certain bank cards issued in these countries are accepted on a reciprocal basis in each country's ATMs. In Finland, the foreign transactions effected with international credit cards are transferred abroad via Luottokunta to the Visa, eurocard and eurocheque systems.

5.6 Credit card techniques

Diners Club issued the world's first credit card in 1950 and Bank of America launched the world's first bank card in 1958. The latter card later become the Visa card. The marketing of Visa cards started in Finland in 1979. Bank cards of the present type were introduced in Finland in 1980. They were preceded by cash cards, which had been used on trial basis for a few years and which could only be used to draw money from cash dispensers.

A basic requirement for universal application of payment cards is standardization of technical solutions. Card technology is based on international standards, the preparation and publishing of which is handled by the International Organization for Standardization (ISO) and by the SFS (Finnish Association for Standardization).
Nowadays, customer data are stored in cards applying three principal techniques: embossing, storing data in a magnetic stripe or storing data in a microprocessor.

5.6.1 Embossed card

Embossing is the oldest way of identifying payment cards. Data on the customer and the card are marked on the card in the form of embossed writing. By placing the card in an imprinter, the embossed data can be reproduced on a sales slip when the customer uses the card for paying.

5.6.2 Magnetic stripe card

The magnetic stripe card is the basic card used in payment systems both in Europe and in the world as a whole. It is forecast that the magnetic card will maintain its dominant position for at least another 10 to 15 years.

Data can be stored in three tracks contained in the card's magnetic stripe, each with its own field of application. The data stored in the data tracks can be read by terminals and ATMs.

5.6.3 Chip card

A chip card (also known as IC card, microcircuit card and smart card) is a plastic card the size of a bank card in which a microprocessor has been embedded. The super smart card is a chip card still at the experimental stage which resembles a pocket calculator with its own keyboard and display.

The microprocessor embedded in a chip can be used for functions which a magnetic stripe card is not capable of performing. Many of the functions associated with the making of a payment can be implemented locally and partly within the card itself without the need for data transmission links to external systems. Because of the reduced communications requirements, the card is cheaper to use in some applications than a magnetic stripe card. But before the chip card can gain widespread use on a scale comparable to magnetic stripe cards and become established as an international payment instrument, international standards concerning its use will have to be agreed on; so far, this has not been accomplished. A chip card can only be used in
connection with electronic card-processing equipment, which is not even available at all retail outlets for the present magnetic stripe cards.

In October 1990, a separate development project called TOIKO (TOIemiKOrtti tietoverkossa = chip card in data network) was launched in Finland in connection with the TELMO project (see 5.4.7). The aim was to create national standards for chip cards and electronic card-readers to be used in the TELMO network. The project was completed at the end of 1992.
The Bank of Finland
Interbank Funds Transfer System
and Payment Clearing

Marianne Palva

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6 Clearing and settlement of banks’ postal giro accounts 119
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1 Banks' current accounts at the Bank of Finland

Traditionally, banks have maintained current accounts at the Bank of Finland for the transfer of funds between the central bank and the banks and for the settlement of payment clearings. Payments between the central bank and the banks passing through these current accounts are mainly related to the maintenance of the currency supply and the provision of central bank financing to banks. Previously, a large number of payments was also effected through these accounts to customers via banks in connection with the provision by the Bank of Finland of special financing to companies under various arrangements. These arrangements, all of which have now been terminated, included financing of domestic deliveries, export bills of exchange and credits for fostering new exports.

With the deregulation of financial markets and lifting of exchange controls in the 1980s, there was a marked increase in the interbank money market and foreign exchange transactions. As these transactions were settled through funds transfers across current accounts kept at the Bank of Finland, both the value and the number of transactions increased. As a result of these changes, monitoring of account positions on a real time basis became increasingly important for banks.

Certain changes introduced in the arrangements for providing central bank financing to the banks further underlined the importance of monitoring accounts. In 1983, the quotas set for debit balances in current accounts were removed and debit balances, calculated as monthly averages, were no longer permitted. At that time, central bank financing was only extended in the form of call money credits. At the beginning of 1986, call money credit and deposit rates were differentiated and, at the end of the year, each bank's current account and call money account were combined to form a single account. In the same context, term credits and deposits were introduced as instruments of monetary policy. In 1987, the Bank of Finland started to undertake open-market operations in certificates of deposit with banks entitled to central bank financing. Since the beginning of 1991, the Bank of Finland has also used repurchase agreements in its money market operations. The combining of the call money and current accounts, the differentiation of the call money credit and deposit rates and the widening in the spread between these rates all served to stress the importance of monitoring accounts for the banks.
In 1989, the possibility of the banks to incur debt through their current accounts was limited to short-term and temporary debts by the introduction of a new interest rate rule. Under this rule, the rate charged for call money credit was twice the normal level if the moving average of a bank's current account position calculated for the last five business days became negative, i.e., showed a debit balance. The new procedure emphasized the importance of monitoring accounts. A bank could optimize its central bank position by running down its current account balance to as close to zero as possible and placing any surplus funds in the interbank market or covering any deficit by borrowing from the market.

In June 1992, the Bank of Finland introduced a liquidity credit system to replace the call money facility, which had been in use for many years. Under the new system, banks entitled to central bank financing could make call money deposits at the Bank of Finland as before but call money credits were replaced by fixed-term liquidity credits.

In order to facilitate and improve the efficiency of banks’ cash management, a technical system was introduced in 1988 which enabled banks to monitor their current accounts at the Bank of Finland on a real-time basis. At this stage, all transactions were, nevertheless, booked at the Bank of Finland. But as interbank transactions and, particularly, the use of overnight credits and deposits increased, there was often a backlog of entries during the last hours of the afternoon. This made it difficult for banks to monitor changes in their liquidity position in real time.

2 The Bank of Finland interbank funds transfer system

To rationalize the management of current accounts, improve the real-time recording of entries and further enhance the monitoring of liquidity positions, the Bank of Finland decided to modify the current account system. The aim was that the new system would enable banks themselves to transfer funds in settlement of payments from their current accounts to other holders of current accounts with the Bank of Finland, thereby expediting entries and facilitating intraday monitoring of accounts.

The Bank of Finland introduced its new interbank funds transfer system (BOF system) in March 1991. Under the new system, banks
have microcomputer-based workstations which are connected with the BOF system via a telecommunications network. The workstations are linked in real time with the Bank of Finland's database for current account transactions. Banks can themselves effect payments to other holders of current accounts with the Bank of Finland through their workstations. All account entries are transmitted to the workstations of the account holders concerned in real time, thus permitting account holders to monitor entries and the balance on their own accounts on a continuous basis. The BOF system functions as a real-time gross settlement system for interbank payments during the business day.

Account holders can also transmit account entries from their other systems to their workstation. Similarly, banks can transmit entries from their workstation to their other systems. The workstation permits banks to transmit data internally on diskettes. In addition, banks have the possibility of further developing their workstation applications to permit automatic transfers.

Initially, six banks and the State Treasury joined the interbank funds transfer system, and workstations were placed at their disposal. The number of participants has subsequently increased and stood at seventeen in spring 1992.

The BOF system involves three types of account entries. First, the system books account entries arising from transactions between the Bank of Finland and the banks. Secondly, transfers of covering funds related to interbank transactions are processed in the system. The third type comprises entries related to payment clearing and funds transfers under various netting systems (Figure 3).

The number of transactions between the Bank of Finland and banks varies between 300 and 350 per day. These are mainly related to the maintenance of the currency supply and to the central bank's money market operations. These transactions also include foreign exchange transactions effected by the central bank with banks in which one of the currencies is the Finnish markka. Normally, the volume of foreign exchange transactions is fairly small but, for example, during the speculative attack against the markka in autumn 1991 their volume was significant at times. The average value of debit and credit entries between the Bank of Finland and the banks is FIM 1-3 billion a day and the average net value of the Bank of Finland's operations in the money and foreign exchange markets is less than FIM 100 million a day. However, day-to-day fluctuations are large: the impact of the central bank's market operations has been close to zero at its lowest and nearly FIM 14 billion at its peak in autumn 1991.
Interbank transactions are mainly related to interbank money market and foreign exchange transactions and to overnight credits and deposits which banks use to even out their liquidity position at the end of the day. The number of interbank transactions has ranged between 300 and 1000 per day. When the BOF system was first introduced, about one-third of the transactions was initiated by the account holders themselves and the rest by the Bank of Finland in accordance with the account holders' instructions. As the number of participants has increased, so too has the number of transactions initiated by account holders themselves. Today, more than two-thirds of all transactions are initiated by account holders. The value of interbank transactions is large, over FIM 20 billion per day on average. It reached its highest point, some FIM 56 billion, in autumn 1991, when there were 780 transactions in all.

3 Daily payment clearing and settlement

The daily net settlement of clearing transactions in the banking system\(^1\) (ie payment services offered by banks to corporate and private customers) is carried out in the Bank of Finland interbank funds transfer system. The Bank of Finland has concluded a clearing agreement with all the commercial banks and the branches of foreign banks operating in Finland. In addition, the Bank of Finland has an agreement with those cooperative and savings banks operating in Helsinki that maintain a current account with the Bank of Finland.

Clearing participants with a workstation linked to the BOF system transmit a clearing calculation electronically to the Bank of Finland. The clearing calculation contains data on their claims and liabilities vis-à-vis the other clearing participants related to customer payments. For the time being, clearing participants without access to a workstation linked to the system send these data in written form to the Bank of Finland, which enters the data into the settlement system on their behalf. The actual settlement, ie transfers of covering funds, takes place by means of a computer run on a centralized basis: data on the claims and liabilities provided by each clearing participant are entered in the current accounts of the relevant parties. Settlement takes place daily at around 3.45 pm (see Figure 3). There are considerable

\(^1\) See the article by Hirvonen et al. in this publication.
variations in the value of the daily payment settlement, calculated as the sum total of each participant’s clearing calculations. It ranges from a few hundred million markkaa to over four billion markkaa.

Banks transmit data on the individual transactions underlying clearing and settlement to each other on a bilateral basis, mainly by telecommunication. Formerly, banks exchanged these data between each other at the Bank of Finland when they delivered clearing data for settlement to the Bank. In fact, representatives of all clearing participants still gather daily at the Bank of Finland for the clearing at around 3.30 pm. The participants can then exchange data on any payments that cannot be effected using the normal electronic payment systems. In the case of banks that have signed the interbank agreement on the electronic transmission of payment data, this manually exchanged data consists of deficient and erroneous transactions. In contrast, banks which are not parties to this agreement deliver all their data on payment transactions in written form to the counterparties in connection with the clearing.

4 Development of payment clearing and settlement services

The clearing and settlement operated by the central bank has long traditions in Finland. The Bank of Finland launched the clearing and settlement services on 1 September 1906. In May 1922, the clearing operations were expanded when five branches of the Bank of Finland joined the clearing. The number of branches providing clearing services increased over the years. But as the use of automatic data transmission techniques became increasingly widespread, clearing at branches became unnecessary. The number of branches providing clearing services was gradually reduced and in February 1987 clearing at branches was terminated altogether.

Initially, the clearing comprised only cheques and postal drafts. In 1943, it was extended to include giros. In the 1980s, clearing transactions grew rapidly as a result of the introduction of more sophisticated payment transfer services by banks and the increased use by private persons of cheques early in the decade and of bank cards in the latter part of the decade (Figure 1). Financial market developments — notably the emergence of a true money market — and rapid economic growth also contributed to the increase in clearing transactions.
Figure 1. **Domestic payment clearing transactions, 1946–1991**

1. Number in millions, left scale
2. Value in billion FIM, right scale

Figure 2. **Average value of individual payment clearing transactions, 1946–1990**

1. Nominal value
2. Real value (adjusted by the GDP deflator)
For example, in October 1991, the average number of clearing transactions was 1.3 million per day with a gross value of over FIM 6 billion. The average number of debit entries was 700,000 and that of credit entries just under 600,000 per day. The value of debit entries amounted to FIM 4 billion and that of credit entries to FIM 2.5 billion per day. The number of debit entries peaked on Mondays (about 1.3 million), reflecting the widespread use of bank cards during the weekend. The highest numbers of credit entries were recorded on the first and last days of October but, all in all, the fluctuations in the number of credit entries were noticeably smaller than for debit entries.

In real terms (adjusted by the GDP deflator), the average value of individual clearing transactions decreased virtually throughout the period 1946 - 1990 (Figure 2). Initially, this was due to the increase in bank giros while in the latter part of the period the rapid growth of first cheques and later bank cards increased the number of retail (small-value) transactions. In October 1991, the average value of a debit entry in real terms was FIM 5,500 and that of a credit entry FIM 4,400.

5 Clearing and settlement of cross-border markka payments (loro clearing)

The clearing of cross-border markka payments has been handled on an alternating basis by Kansallis-Osake-Pankki (KOP) and Union Bank of Finland Ltd for periods of five years at a time. For the past five years it has been provided by Kansallis-Osake-Pankki. At the beginning of 1992, the major banks started to clear these payments on a bilateral basis. Nevertheless, Kansallis-Osake-Pankki continues to provide the clearing service for other banks against a charge.

The net settlement of cross-border markka payments is handled daily in the BOF system. In bilateral settlement, the remitting party transfers covering funds from its own current account to the recipient’s current account at the Bank of Finland. As regards settlement under the centralized clearing system, the bank providing the service (ie KOP) transmits a clearing calculation electronically via its workstation to the BOF system. The calculation contains data on the claim or liability of each loro clearing participant. On the basis of the calculation, the Bank of Finland makes the necessary transfers across the banks’ current accounts daily at around 2.30 pm (Figure 3).
Different clearing systems linked to the Bank of Finland interbank funds transfer system

- **NET SETTLEMENT OF BANKS' PAYMENT CLEARING**
  - (giros, reference giros, cover for express transfers, recurrent payments, direct debits, cheques, bank drafts, card debits)

- **NET SETTLEMENT OF BANKS' POSTAL GIRO ACCOUNTS**
  - (Postipankki)

- **NET SETTLEMENT OF LORO CLEARING**
  - (Cross-border payments in FIM)

- **NET SETTLEMENT OF HELSINKI MONEY MARKET CENTER CLEARING**

- **NET SETTLEMENT OF HELSINKI STOCK EXCHANGE CLEARING**

- **BANK OF FINLAND INTERBANK FUNDS TRANSFER SYSTEM**
  - 9.00 12.00 13.00 14.00 15.00 16.00 16.30

- **GROSS SETTLEMENT OF INTERBANK TRANSFERS**

- **ACCOUNT HOLDERS' WORKSTATIONS**

- **TRANSFERS FROM THE BANK OF FINLAND**

- **BANK OF FINLAND'S OTHER ACCOUNTING SYSTEMS**
6 Clearing and settlement of banks' postal giro accounts

Most banks maintain postal giro accounts at Postipankki for payment transfer purposes. Outstanding balances in these accounts are transferred daily to each bank's current account at the Bank of Finland or, in the case of a debit balance, the deficit is covered by a transfer of covering funds from the bank's current account at the Bank of Finland. In this way, the balances in the postal giro accounts are brought back to zero at the end of each day. As a rule, Postipankki transmits a clearing calculation containing data on the necessary funds transfers via its workstation to the Bank of Finland, which books the transfers to the banks' current accounts daily at around 3.15 pm (Figure 3).

7 Settlement of the Helsinki Money Market Center's clearing

Settlement of trading in book-entry securities maintained in the system operated by the Helsinki Money Market Center Ltd (HMMC) is also effected via the Bank of Finland's interbank funds transfer system. The HMMC system enables the participants to monitor their own net positions. As the HMMC operates according to the principle of multilateral netting, each participant has either a net credit or debit position vis-à-vis the other participants for each day.

Settlement is effected by means of a two-stage procedure. Each participant in the system who is liable to pay on a particular day transfers the relevant sum to the HMMC's current account at the Bank of Finland not later than 1.00 pm. After this, in connection with the clearing run (around 2.00 pm), the HMMC transfers the funds to those participants who have a net claim on the basis of trades for the day in question (Figure 3).

Payments between participants are effected through the HMMC's current account at the Bank of Finland whereas payments between the participants and their customers are effected outside the HMMC data system.

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2 See the article by Vehkamäki in this publication.
Payments of subregister keepers who are guaranteed by a HMMC member who is a shareholder can be effected either through the member or independently. A shareholder has to inform the HMMC which of the two methods is applied by each of the subregister keepers it guarantees and of the accounts used. However, a shareholder is always liable to the HMMC for the payments of the subregister keepers it has guaranteed.

8 Future prospects

The Bank of Finland's interbank funds transfer system and the telecommunications network which has been set up to serve it offer scope for various development projects. At the moment, the use of the network is being expanded with a view to replacing magnetic tapes and other data transmission channels between banks and the Bank of Finland by a centralized service operated via the telecommunications network of the BOF system.

In May 1992, the Helsinki Stock Exchange introduced a book-entry system for securities, initially for share transactions. Since September 1992, payments associated with book-entry transactions have been effected through a current account opened for the Stock Exchange at the Bank of Finland.

With fairly small enhancements, the BOF system could be used for the transmission of customer data related to payments. The system could then be used for effecting payments to the accounts of banks' customers and also for the transmission of large-value customer payments on a real time basis without value date losses. If data on payments and the associated funds could be transferred simultaneously, the finality of the settlement would be guaranteed and the risk of settlement failure would be eliminated.

As international integration proceeds, the funds transfer network in a national banking system must be able to communicate with the corresponding systems in other countries. In this context, the central bank might act as a nodal point linking the different systems.

\[3 \text{ See the article by Kaiponen in this publication.}\]
International Payments


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1 Introduction

International trade-related payments, ie payments to and from foreign countries based on foreign trade conducted by companies resident in Finland, comprise payments made for imports or received for exports. As Finnish companies have become more international, commercial payments for goods or services produced abroad have also increased.

The removal or easing of foreign exchange controls in many countries has encouraged Finnish companies to engage increasingly in cross-border economic and financial activities. This has led to a rise in the volume of capital transactions associated with foreign borrowing and investment.

International payments also include transactions related to travel or residence abroad by Finnish citizens or by foreigners in Finland. Banks offer special services for these transactions.

International payments can be remitted and received in Finnish markkana or in other currencies according to the wishes of the payer and payee.

Table 1. Currency composition of Finland's foreign trade, January-December 1993, % of imports and exports*

<table>
<thead>
<tr>
<th></th>
<th>Imports</th>
<th>Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>USD</td>
<td>29.1</td>
<td>24.3</td>
</tr>
<tr>
<td>FIM</td>
<td>20.7</td>
<td>15.0</td>
</tr>
<tr>
<td>DEM</td>
<td>19.2</td>
<td>15.6</td>
</tr>
<tr>
<td>SEK</td>
<td>7.0</td>
<td>11.0</td>
</tr>
<tr>
<td>GBP</td>
<td>4.2</td>
<td>10.0</td>
</tr>
<tr>
<td>FRF</td>
<td>2.3</td>
<td>5.2</td>
</tr>
<tr>
<td>NLG</td>
<td>2.7</td>
<td>2.8</td>
</tr>
<tr>
<td>DKK</td>
<td>2.1</td>
<td>2.1</td>
</tr>
<tr>
<td>ITL</td>
<td>2.0</td>
<td>2.4</td>
</tr>
<tr>
<td>ECU</td>
<td>0.4</td>
<td>1.9</td>
</tr>
<tr>
<td>Other</td>
<td>10.3</td>
<td>9.7</td>
</tr>
</tbody>
</table>

100.0  100.0

* Data derived from the customs statistics.

Finnish companies conduct the major part of their foreign trade in foreign currency. Hence, foreign exchange is an important area of business for Finnish banks, as they have to raise the covering funds for their customers' foreign currency payments.
The main currencies used in foreign payments in Finland are the US dollar, the Finnish markka and the Deutsche Mark (Table 1). Being an international currency, the significance of the US dollar as a payment currency is many times greater than that of trade between Finland and the United States (Table 2).

Table 2. Country composition of Finland’s foreign trade in 1992*

<table>
<thead>
<tr>
<th></th>
<th>Exports in million FIM</th>
<th>share, %</th>
<th>Imports in million FIM</th>
<th>share, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>16 806</td>
<td>15.6</td>
<td>16 085</td>
<td>16.9</td>
</tr>
<tr>
<td>Sweden</td>
<td>13 771</td>
<td>12.8</td>
<td>11 133</td>
<td>11.7</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>11 519</td>
<td>10.7</td>
<td>8 213</td>
<td>8.6</td>
</tr>
<tr>
<td>United States</td>
<td>6 365</td>
<td>5.9</td>
<td>5 792</td>
<td>6.1</td>
</tr>
<tr>
<td>France</td>
<td>7 204</td>
<td>6.7</td>
<td>4 382</td>
<td>4.6</td>
</tr>
<tr>
<td>Netherlands</td>
<td>5 628</td>
<td>5.2</td>
<td>3 458</td>
<td>3.6</td>
</tr>
<tr>
<td>Russia</td>
<td>3 020</td>
<td>2.8</td>
<td>6 725</td>
<td>7.1</td>
</tr>
<tr>
<td>Japan</td>
<td>1 370</td>
<td>1.3</td>
<td>5 202</td>
<td>5.5</td>
</tr>
<tr>
<td>Other (less than 5 %)</td>
<td>41 788</td>
<td>39.0</td>
<td>33 998</td>
<td>35.9</td>
</tr>
<tr>
<td>Total</td>
<td>107 471</td>
<td>100.0</td>
<td>94 988</td>
<td>100.0</td>
</tr>
</tbody>
</table>

* Data derived from the customs statistics.

In Finland, interbank domestic payment services are based on highly advanced electronic data transmission systems. These systems have also provided technical opportunities for developing foreign payment services: nowadays, customers’ foreign payments can be effected through banks as efficiently as domestic payments.

A notable difference between domestic and foreign payments relates to the concept of value date. In the case of domestic payments, value date refers to the last or first day on which interest is calculated. In the case of foreign payments, value date merely means the last day on which funds related to a transaction are at the disposal of the remitting bank or the first day on which the funds are available for use by the receiving bank.

While banks formerly sent instructions on foreign payments to each other by mail and telex, they now use computerized data transmission techniques and the SWIFT system.
2 Central bank’s role in international payments

2.1 Foreign payments at the Bank of Finland

Under Finnish law, the Bank of Finland is the country’s main foreign exchange authority. The Bank maintains Finland’s official currency reserves and quotes the markka’s exchange rate against the major foreign currencies. The Bank participates in the foreign exchange market, whenever necessary, to support the markka’s external value. In fact, most of the Bank of Finland’s foreign payments are connected with the investment of the foreign currency reserves and the buying and selling of currencies, ie intervention in the foreign exchange market.

With the development of more sophisticated methods of payment and the dismantling of exchange controls, the vast majority of domestic and foreign payments of companies and private persons no longer pass through the Bank of Finland but are instead handled by other banks. Since the 1970s, the central bank has sought to gradually reduce the banking services it provides to private customers.

As is typical of central banks, the Bank of Finland also acts as the bankers’ bank in international payments. Among the main foreign customers of the central bank are other central banks and international organizations. The Bank of Finland manages contacts with the International Monetary Fund (IMF), of which Finland is a member. The Bank is also a shareholder in the Bank for International Settlements (BIS). The Bank maintains close and varied contacts with many international monetary institutions and organizations as well as with foreign central banks.

In many cases, central banks only remit payments abroad through other central banks. For this reason, many foreign central banks maintain a markka account with the Bank of Finland. Certain international organizations also maintain accounts with the Bank of Finland. This is because these organizations are not always familiar with banking systems in different countries and because they are anyway used to holding their funds with central banks. Sometimes the regulations governing the activities of these organizations specifically require that funds be transferred through central banks.

Foreign central banks and organizations send payments via the Bank of Finland to be credited to customers’ accounts with Finnish banks. Payment orders are remitted by telex, mail and, increasingly,
through the international data transmission network provided by SWIFT. When a foreign bank sends the Bank of Finland an instruction to transfer markka funds from its account to an account with another Finnish bank, the funds are transferred to the bank where the beneficiary’s bank holds a clearing account for this purpose. Finnish banks have issued each other instructions concerning the clearing of markka-denominated payments (loro clearing) remitted from abroad. Payment orders in foreign currency are likewise transferred directly to the domestic bank where the beneficiary holds an account. At the same time, funds are transmitted via a foreign correspondent bank to the foreign bank where the domestic bank holds its account to cover the respective customer transfer. In most cases, the central bank acts as an intermediary, ie forwards incoming payment orders to other Finnish banks.

As regards the foreign transactions of the Finnish government, the Bank of Finland is responsible for effecting transfers of foreign currency funds related to government borrowing. These transactions are significant as regards the country’s foreign currency reserves. Transfers are made by the order of the State Treasury. Otherwise, the central bank is not involved in handling foreign payment transactions by the government.

As a precaution against possible crisis situations, central banks maintain a readiness for handling part of their country’s foreign payment services. In addition, central banks play a major role when countries agree on exceptional payment operations or special bilateral arrangements. For example, the Bank of Finland for long managed the settlement of payments related to Finland’s trade with the Soviet Union. Until 1991, funds were transferred through clearing accounts maintained with the Bank of Finland. Finnish banks authorized to engage in foreign exchange transferred their customers’ payments abroad via the Bank of Finland, which, in turn, forwarded incoming payments from abroad to the authorized banks for crediting to their customers’ accounts.

Central banks in industrialized countries employ highly advanced technology in their in-house payment systems. As the payment orders transmitted by central banks are often substantial, it is important that these transfers are rapid and secure. Together with other Finnish banks, the Bank of Finland uses the SWIFT data transmission network to effect foreign payments. Services provided by Euroclear and international banks are mainly used for the settlement of purchases and sales of international securities.
2.2 Monitoring of foreign payments and balance of payments statistics

Transactions between an economy and the rest of the world are depicted by means of balance of payments statistics. The balance of payments is a record of transactions between Finnish residents and non-residents and the debt obligations arising from these transactions. The balance of payments is part of an overall system describing the economy and has interconnections with calculations of national income and wealth, the central bank’s balance sheet and calculations of credit stocks and flows. The Bank of Finland is responsible for the collection, compilation and publication of Finland’s balance of payments statistics.

2.2.1 Systems for the compilation of balance of payments statistics

The IMF gives instructions and recommendations concerning the compilation of balance of payments statistics. In practice, countries developed quite different statistical systems on the basis of these general recommendations. During the past few years following the dismantling of exchange controls and increasing European harmonization, the compilation of balance of payments statistics has undergone a complete reform.

A feature common to almost every European country is that data on foreign payments are used in the compilation of the balance of payments. Now that there is no exchange control, the importance of foreign payments has actually grown. In addition to data on foreign payments, other sources of balance of payments statistics include separate surveys on outstanding foreign claims and liabilities plus related capital flows covering financial institutions and other companies. Sampling methods are used in the surveys to collect data on the corporate sector. The data on entities outside the surveys are obtained on the basis of foreign payments.

The obligation to submit data for balance of payments purposes is laid down in the Foreign Exchange Act, on the basis of which the Bank of Finland publishes detailed reporting instructions.
2.2.2 Reporting of foreign payments

The Finnish system of monitoring foreign payments is based on the reporting of both transactions in correspondent accounts maintained by the authorized banks and transactions in accounts held abroad by other economic units for payment purposes. This kind of reporting system is called a 'closed' system.

Authorized banks report the net balances and transactions in their correspondent accounts abroad and the corresponding data in foreigners' accounts with them on a daily basis. Transactions exceeding FIM 10 000 are reported separately (FIM 50 000 from 1 January 1994). Because of the large amount of data involved, reporting has been carried out electronically for more than ten years.

Other economic units holding accounts abroad for payment purposes report the balances and transactions to the Bank of Finland on a monthly basis. Companies can also join payment netting systems and report the related gross flows of payments directly to the central bank.

The most important data as regards the compilation of balance of payments statistics are the values of the foreign payments and the Finnish counterparties to the payments. The Finnish counterparty is identified by the company's trade register number. The number shows, inter alia, the industry in which the company operates, which, in turn, gives an indication of the type of payment.

The payment data are classified roughly into balance of payments items according to the purpose of the payment. The company or person effecting the foreign exchange transaction is required to inform the bank of the purpose of the payment.

In checking the consistency of the payments data, special attention is paid to the currencies in which the payments are made and to changes in the balances of accounts that the banks use for making payments. Some ten different payment codes are needed for classifying the data according to the purpose of payment. Usually, these data are already required when the payments are made in banks.

2.2.3 Payment data: quality control and use in balance of payments statistics

The quality control of payment data is the key to ensuring the correctness of the basic data used in compiling balance of payments statistics. The correctness of payment data is examined from several points of view. The data are stored and kept up to date, classified, for example, by payment codes and company.
The balance of payments is compiled by combining data from different sources. Payment data constitute the only source for many services, interest payments and other items in the current account. As regards capital flows, the payment data are the primary source of information on, for example, direct investment. In Finland, it is also possible to combine data on goods and payment flows. Payment data are available with a very short lag and they play an important role in the production of preliminary figures for all components of the balance of payments.

By monitoring payments, it is possible to avoid systematic and magnitude errors in the compilation of the statistics. Banks and economic units which effect foreign exchange transactions do not classify payment items in a very reliable way. Under the new system applied in Finland, data on payments and survey data are compared with each other. In addition, the economic units which effect and receive foreign payments form the population from which respondents to the surveys are selected.

2.2.4 Importance of balance of payments statistics

Balance of payments statistics include data on variables which serve as indicators of equilibrium in the economy, such as the current account. The current account is composed of trade in goods and services, net investment income and unrequited transfers to and from abroad. The current account shows the change in a country’s net foreign assets or liabilities, ie the adequacy of the economy’s own financial resources — saving — for financing investment. The current account also gives an indication of the country’s trade performance.

The current account also constitutes a constraint for the formulation of fiscal policy, in particular. If an economy is indebted, it means that the present standard of living has been maintained by means of income that will possibly be received in the future. As the future is always uncertain, the accumulation of debt must be restricted. The running up of debt in sectors that do not directly generate export income is particularly hazardous as far as the external balance of the economy is concerned.

These equilibrium variables constitute information which affect activities in the financial markets. Interest rates are influenced by the state of the economy but, especially in a small country like Finland, they are also highly dependent on the credibility of the country’s economic policy. Interest rates may react strongly to changes in the equilibrium variables
that deviate from expectations. If there is too much bad news, the credibility of the economic policy is also put to test.

As international integration proceeds and intensifies, the importance of reliable statistical data increases. Market participants — both Finns and foreigners — must have correct information on Finland. In addition, integration increases the exchange of data at the international level, particularly through international organizations.

The current account is financed by capital transactions, which are also sensitive to credibility problems. Thus, it is necessary to examine capital flows with differing degrees of sensitivity individually, i.e. by sub-markets consisting of different assets. Among the main groups of assets appearing in the balance of payments are direct investments, portfolio investments based on shares or other negotiable instruments, ‘private placement’ loans, deposits and trade credits.

For a country, like Finland, which is becoming increasingly indebted to the rest of the world, it is important to monitor which sectors of the domestic economy are raising loans abroad and in what type of instruments. Similarly, it is important to monitor the acquisition of markka-denominated securities by foreign investors.

The balance of payments is always in equilibrium: if, for example, the total capital inflow is not sufficient to finance the deficit on the current account, the central bank’s foreign exchange reserves decrease. In order to prevent the emergence of a balance of payments crisis, the central bank must see to it that the foreign exchange reserves are sufficient.

3 Banks’ role in international payments

3.1 Correspondent banking system

International payments involve the flow of funds between different countries, primarily in the form of the convertible currency of the remitting or receiving country or a third country. For this purpose an international banking network is needed for transmitting payment instructions between different countries.

Banks have different techniques at their disposal for transmitting payment instructions: SWIFT, telex and mail.
Correspondent banks

Banks need at least one correspondent bank in each country into or out of which funds are transferred. Foreign banks known to be solvent and efficient are chosen as correspondent banks. In practice, each bank has several correspondent banks in each country, and their activities are constantly monitored.

Correspondent banks offer various services and provide information on political and economic events in their country, as well as news on the banking community. In addition, they arrange international business contacts and thus help to promote international trade.

Banks also recommend the use of their correspondent banks for companies that need pooling accounts, payment accounts or investment accounts abroad.

When a bank’s international activities become so extensive that services provided by a correspondent bank are no longer sufficient, the bank can set up a branch, subsidiary or representative office to complement the correspondent services. However, a representative office is not allowed to handle the transmission of international payments.

Correspondent banks are bound by the internal regulations and laws of the country where they are located. In addition, bilateral agreements are usually drawn up between banks. These agreements concern, for example, various methods of identification and authenticity checking to secure the safety of funds transfers.

A correspondent bank executes the payment to the beneficiary or forwards the payment instructions it has received to the beneficiary’s account-keeping bank. Foreign cheques sold to customers may be drawn on the correspondent bank. It is also possible to agree on various types of custody services for securities, financing, credit facilities etc.

Account-keeping bank

The account-keeping bank is a correspondent bank that maintains an account — usually denominated in its domestic currency — on behalf of another bank. In exceptional cases, the account can also be in another currency. If correspondent banks do not maintain accounts with each other, they inform each other of the account-keeping banks they use for each currency.
Nostro accounts

A nostro account is an account held by a Finnish bank with a foreign correspondent bank in a foreign currency. The term nostro (our) is Italian as originally are many other banking terms.

Loro or vostro accounts

Looked at from the Finnish party’s point of view, an account held by a foreign correspondent bank at a Finnish bank in Finnish markkaa is called either a loro (their) or vostro (your) account.

Value date

The value date is always specified in payment orders between correspondent banks. It refers to the date when the funds concerned cease to be at the remitting bank’s disposal and become available for use by the correspondent bank.

Cut-off time

The internal clearing system of each country determines the time by which payment orders must arrive at the correspondent bank on the value date for them to be handled during the same day. If a payment order arrives after the cut-off time, it will be handled on the following business day.

Account maintenance

In accordance with general practice and even the law in some countries, foreign accounts must not be overdrawn. It may happen that a payment order is not executed on the requested value date because of the lack of sufficient funds in the account that day. Penalty interest based on current interest rates is charged on all overdrafts, even unintentional ones.

No interest is usually paid on positive balances in accounts. For this reason banks try to keep their daily balances as small as possible. Balances in accounts are monitored by banks’ foreign exchange departments, which are informed of all debit and credit transactions in
foreign currency. The costs incurred in the maintenance of the account are charged by the correspondent bank to the holder of the account.

Double-entry book-keeping is always used and each bank with a nostro account applies the method of 'shadow book-keeping' in its internal accounting.

Arranging covering funds for nostro accounts

Foreign exchange departments can monitor their nostro accounts fairly closely with the aid of transaction notifications they receive. If it seems likely that there will be surplus funds in a particular account at the end of the day, the bank can invest them in the overnight market or sell them. On the other hand, if more covering funds are needed in one account, funds can be transferred to it from another account in the same currency. Should this not be possible, the bank buys or borrows the necessary amount of currency in the market.

After honouring a cheque denominated in a foreign currency, a bank sends it to its correspondent bank, which credits the amount to the nostro account of the remitting bank. If it turns out that there are insufficient funds in the drawer’s account, the correspondent bank debits the missing amount from the nostro account of the remitting bank and returns the cheque to the bank.

Arranging covering funds for loro accounts

In a similar way, a foreign correspondent bank sees to it that there are sufficient covering funds in its Finnish markka accounts on each value date. If funds are not sufficient, it is possible that the payment order will not be executed. Interest is also charged on overdrafts.

3.2 Interbank payments

When banks send and receive customers’ foreign payments instructions through their correspondent banks, they execute the actual currency transfers involved, i.e., transfers of covering funds for the foreign payments, as their own payments to their correspondent banks in the form of interbank payments.

These interbank funds transfers arise from major foreign exchange deals; part of them are between customers and banks but the majority are currency deals between banks.
International investment and securities trading also give rise to a need for funds transfers that originate from either deals between customers or deals between banks.

Banks in Finland do not clear and settle foreign currency deals between themselves. Rather, currency payments between banks are covered in the account-keeping correspondent bank abroad, according to the currency concerned.

4 International payment services for customers

4.1 Payment instruments

4.1.1 Foreign currency

Cash payments

Cash is widely used as a means of payment for effecting foreign currency payments because it is easy to use. The disadvantage of cash is insecurity. Lost cash is still quite poorly covered by insurance policies.

Besides travel exchange, cash is also used to some extent to effect trade-related payments in cases where purchases must be paid for in cash, eg in auctions.

Circulation of cash

Finnish banks usually acquire foreign currency in the form of cash in three ways. The major part of foreign currency sold in Finland is bought abroad from banks specializing in the sale of banknotes. The most important of these banks are located in the United Kingdom, Switzerland, Denmark and Sweden.

Another way for banks to acquire banknotes is by ordering them from their own accounts with banks abroad. However, when demand is brisk, this method is often too slow.

A small portion of the banknotes available for sale originates from purchases made by the banks' branches from the public. However, as the purchased notes do not usually match demand in terms of currency
and denominations, the purchased notes are sold abroad and the required currencies bought from abroad.

Price of banknotes

Banks sell foreign banknotes at a higher price and buy them at a lower price in comparison with foreign currency transactions involving transfers between bank accounts, because the storage of foreign notes entails various costs to banks. The price of notes paid to foreign banks is higher than the price for foreign currency transactions between bank accounts. The delivery of notes involves transportation and insurance costs. Because of counterfeit notes in circulation, notes must be carefully checked by hand, which is expensive. Costs are also incurred to banks from keeping notes in storage in the form of foregone interest.

Selection of banknotes

Finnish banks usually sell and buy banknotes in the currencies of some 20 to 30 different countries. The selection is determined by demand. The most important currencies are the United States dollar, the Deutsche Mark and the Swedish krona. There are certain currencies which cannot be stored as their export and import are forbidden under the law of the respective countries, for example certain countries in eastern Europe. Banks buy and sell foreign coins to a very limited extent.

4.1.2 Traveller's cheques

Traveller's cheques have been used as a means of payment for more than 100 years. The basic idea of a traveller's cheque is simple: it is a personal means of payment which the buyer signs at the time of purchase. The signature links the cheque to its owner. When the owner presents it for honouring or gives it in payment, he signs it again. By comparing these two signatures, the acceptor can make sure that the cheque is in the right hands. Usually the user of a cheque is required to prove his identity and, in the case of large sums, he may also be asked to present the receipt for the purchase of the cheques.

Traveller's cheques are cashed at banks. In many countries, they can also be used for payment in offices of companies providing tourist
services. In the United States, traveller’s cheques are used as a means of payment just like cash and banks do not normally accept traveller’s cheques for depositing in an account, except from their own customers.

Traveller’s cheques are issued by commercial banks and traveller cheque companies, of which the biggest and oldest are American Express and Thomas Cook. Cheques are available in some 15 different currencies and in various denominations. The denomination is ready-printed on the cheque.

The popularity of traveller’s cheques stems from their security. The issuer indemnifies the buyer if he loses the cheques or if they are stolen. Today, the indemnification service provided by traveller cheque companies is based on notification by telephone, and this service is worldwide. A person who has lost his cheques must immediately call the nearest indemnification centre. In most countries, indemnification can be arranged during the journey.

Though traveller cheque companies sell cheques at their own offices the vast bulk are sold through their extensive network of sales agencies, including banks and travel agencies. When a customer cashes a traveller’s cheque, the acceptor is compensated for the amount cashed by the traveller cheque company. In addition, the acceptor charges the owner of the cheque a commission covering handling fees and interest expenses incurred from the moment the cheque is cashed until the acceptor receives the funds due to him from abroad.

The main reason for buying traveller’s cheques is to purchase travel exchange. In the United States they are commonly bought for domestic travel purposes. In Finland it became possible to buy traveller’s cheques for investment purposes following the abolition of exchange control.

A traveller’s cheque is an endorsable cheque but if endorsed, it ceases to be a traveller’s cheque and loses its security features, thus becoming just like any private cheque.

4.1.3 Eurocheques

The eurocheque system was established by banks in fifteen European countries in 1968. Finnish banks have been members of the system from the beginning. Initially, their participation was limited to cashing eurocheques but since 1975 they have also been issuing eurocheques and eurocheque cards to their customers.
The system is based on cheques that are always used in conjunction with a guarantee card. When a cheque is written and accepted in compliance with the rules jointly agreed by the member banks, the bank on which the eurocheque is drawn (account-keeping bank) guarantees covering funds for the party cashing the cheque (accepting bank), thus avoiding the need for the latter to carry out expensive and time-consuming enquiries. This makes it possible to use eurocheques abroad not only at banks but also at hotels, restaurants, shops and other retail outlets as they can accept cheques from foreign tourists without risk.

Currently, the eurocheque system covers 40 European and non-European Mediterranean countries. Cheques can be cashed at 240,000 bank branches and also used for payment in retail outlets. In addition, the eurocheque card can be used to withdraw funds from a total of 35,000 cash dispensers in 16 countries.

Almost 100,000 foreign eurocheques are accepted annually in Finland. They are either cashed at banks or used for payment in retail outlets.

Eurocheques accepted in Finland are sent abroad via a bank which has been jointly selected to serve as a clearing bank for these transactions. The clearing bank transfers covering funds to the accepting bank and forwards the cheques to the account-keeping bank, which, in turn, reimburses the clearing bank.

4.1.4 International cards

Cards used in different systems

Several cards connected to worldwide systems are used in Finland, such as Visa, Eurocard, MasterCard, American Express and Diners Club. The latter two are available directly from the issuing companies while the other cards are issued by companies owned partly or entirely by a bank. These companies also make the agreements regarding the use of foreign cards in Finland. In addition, eurocheque cards are available at banks. Some companies have their own credit cards, which can also be used for certain purposes abroad. Similarly, cards issued by certain foreign companies, such as oil companies, can be used at certain Finnish retail outlets.
Properties of cards

International cards are of two types: they can either be charge cards only or incorporate, for example, a bank card, a credit card or membership of an organization. Some card companies offer additional benefits such as travel insurance or help in emergency situations.

The best known cards are primarily used to pay for goods and services but many of them can also be used as means of payment, for cash withdrawals at banks or for use in ATMs. There are also cards designed specifically for use in ATMs and those that can be used both as ATM cards and as guarantee cards for cheques. International cards are also used as a means of payment for mail order purchases.

Cardholders are billed for purchases made with charge cards. By contrast, the account of the cardholder is debited directly for the use of, for example, a eurocheque card for cash withdrawals from cash dispensers abroad without separate billing.

How does the system function?

The use of an international card is always based on agreements. The card company and the cardholder make an agreement whereby the company undertakes to provide certain services on pre-agreed terms and conditions and the cardholder undertakes to observe the terms and conditions and to settle his bills and pre-agreed fees for the use of the card.

For cards to be used, the card company must also make agreements with banks and retail outlets concerning the services which they are willing to provide to cardholders. The card company, in turn, undertakes to pay the claims of a retailer if the latter has acted in compliance with the pre-agreed rules.

The holder receives a sales slip or receipt for each purchase and cash withdrawal made with the card. He should keep the receipts and use them to check that the debit items listed in the bill are correct. The receipts are usually denominated in local currency. However, Finnish cardholders are usually sent bills in which foreign currency sums have been converted into markkkaa.
4.2 Methods of payment

One of the key areas in trade negotiations is the agreement on methods of payment. Through the selection of the method of payment, the buyer and the seller can influence the outcome of the negotiations as well as the final price and profitability of the deal. For settlement of international payments, there are basically four alternative methods available: payment order, cheque, collection and documentary credit. Each of them can be used to settle payments in the currency of either the remitting or receiving party’s country or in any other convertible currency.

4.2.1 Clean payments

A method of payment which does not involve any conditions between the banks or any documents between the buyer and the seller is referred to as a clean payment. This category includes payment orders and cheques (Figure 1).

Figure 1. Flow diagram for clean payments
Application

Payment orders and cheques are used when the relationship between the payer and the payee is an established and reliable one and separate terms and conditions are unnecessary. The buyer of the goods or services settles the invoice to the seller according to a mutual agreement on open account terms.

In addition, payment orders are used when payment is made to the payee’s currency account with some other Finnish bank or to the non-resident’s foreign currency or markka account in Finland.

Applicable exchange rate

Unless otherwise agreed, the bank applies the selling rate quoted at the time of transferring the currency in the case of outgoing payments and the buying rate in the case of crediting incoming payments to the beneficiary.

If the currency is not quoted, payments cannot be made without a special exchange rate clause.

Service charges

In Finland, the payer’s bank charges the payer for services in an agreed manner on the basis of the current bank tariff. The beneficiary pays the costs incurred to the beneficiary’s bank, unless otherwise agreed in the order. In addition, the correspondent bank can deduct a fee from the amount to be remitted.

Value date

The value date practice is based on international foreign exchange dealing where the purchasing parties receive and the selling parties deliver the currencies two business days after the date of the deal. For this reason, the value date of a foreign order between banks is normally the second banking day after the date of the deal.

The normal value date can be ignored in the case of an express payment order or in other cases if it has been separately agreed on with the foreign exchange department of the remitting bank.
The foreign value date is not the date when the funds are available to the beneficiary. The receipt of the payment depends on the practice applied in the country and bank concerned as well as on mutual agreements between the beneficiary and the bank.

Cut-off time

The internal clearing system in each country determines the time by which orders must arrive at the correspondent bank on the value date for the payment to be settled during the same day. If an order is received after the cut-off time, it will be handled on the following business day.

Customer’s responsibilities

A resident in Finland may choose to effect or receive foreign payments either through an authorized bank or using some other method. If payments to or from a foreign country are effected through an authorized bank, the authorized bank supplies information on the foreign exchange transaction to the Bank of Finland, as specified in the foreign exchange reporting instructions. If some other method of payment is used, the resident effecting the foreign exchange transaction must himself provide the Bank of Finland with information on the transaction. The resident party to a foreign exchange transaction is always responsible for the correctness of the information. The authorized bank is obliged to request the resident party to give details of the purpose of the payment and other information required under the foreign exchange reporting rules.

Payment orders and cheques must be based on an acceptable foreign exchange transaction. On request, the customer must supply an explanation of the origin of the funds.

Bank’s liability for damages

The bank only compensates for damages caused by the bank’s negligence in remitting a payment or in receiving or transferring an incoming payment order.
Payment instruction

The payer provides the bank with an unconditional, unrestricted and irrevocable instruction, either on a written order form or electronically via his own terminal, to credit the beneficiary’s account with a specified amount of foreign currency or to keep it available for the beneficiary.

In the instruction, the payer must provide the bank with the following information concerning the payment:

- method of effecting the payment (payment order, express payment order or cheque)
- beneficiary’s name and address
- beneficiary’s banker details and account number
- currency and amount of the payment.

The payer is responsible for seeing to it that sufficient funds, including service charges, are available at the remitting bank to execute the order.

The date when the payer’s account is debited with the amount of the payment or its equivalent and the service charges is called the debit date.

International payment order

An international payment order can be compared with a domestic bank giro by which money is sent to the beneficiary via banks.

A payment order is an irrevocable order, based on the payer’s instruction given by the remitting bank to the correspondent bank, to pay the beneficiary the amount indicated in the order or to transfer this order to be effected by another bank.

Instructions between banks are given using different data transmission methods: usually in the form of SWIFT messages and, if there is no SWIFT connection, by telex or letter.

In Finland, the remitting bank sends the payment order, in accordance with the instruction received, within three business days from the date when the instruction was given and assumes responsibility for seeing to it that the payment order has been received at the correspondent bank. The time limits vary from country to country.

Similarly, a payment order received by a Finnish bank from a correspondent bank is credited to the beneficiary’s account not later
than three business days after the foreign value date if the instruction
has arrived at the beneficiary’s bank not later than 8 am on the foreign
value date.

Returns and amendments

If the sender wants to amend the payment order or to have it returned,
a separate instruction must be given. When the bank returns the
incoming payment abroad as instructed by the customer, the terms for
outgoing payments are applied.

Express order

An express order is a payment order which is effected and handled
before all other payments. The value date is usually the business day
following the day the instruction is given and the charge is higher. An
express order can be confirmed to the beneficiary by a separate telex,
sent at the payer’s request.

Cheque

A bank draws a cheque according to the instructions it has been given.
Cheques must comply with the Cheque Act and be drawn on a
correspondent bank for payment to the beneficiary or to the order of
the beneficiary. Usually a cheque is drawn on the account-keeping
correspondent bank. If it has been drawn on a correspondent bank
other than the account-keeping bank, the drawing bank must transfer
the covering funds separately to the remitting bank.

Cheques are used less nowadays as payment orders are a faster,
cheaper and, above all, more secure method of payment. Cheques are
convenient when the sender wishes to attach some other material to
the payment or when the beneficiary’s banker details are not known.

Mailing

A bank can mail a cheque against a separate service charge specified
in the bank’s tariff or hand over the cheque to the buyer, who then
mails it himself to the beneficiary. For security reasons, it is
recommended to use a crossed cheque and to send it by registered
mail. A cheque should be sent quickly because it expires within a set period prescribed in the Cheque Act.

The right to title may, however, differ between countries. This means that the bank honouring the cheque may accept it for collection even after the expiry date, against a separate charge.

Honouring

Usually a bank immediately honours cheques drawn on other banks that are presented by its own customers. In the case of cheques presented by unknown customers the bank either accepts them for collection or retains the funds at the branch until it has checked that there is sufficient cover.

Endorsement

An endorsement must always be marked on a cheque in the same form as the beneficiary's name is given on the face of the cheque. The endorser is legally responsible for paying the cheque.

Cancellation

The payer can give separate instructions to cancel a cheque that he has sent. However, in so doing, he undertakes to assume liability if the cheque has already been honoured. A cheque is considered to be cancelled only after the remitting bank has confirmed the cancellation.

SWIFT cheque

With the development of international payments, various hybrid methods of payment have come into being, such as the SWIFT cheque. From the remitting bank's point of view, it is a payment order, on the basis of which the correspondent bank draws a cheque and mails it to the beneficiary. A SWIFT cheque is more secure than an ordinary cheque because the mailing distance is shorter. It can be used when the beneficiary's banker details are unknown but his full address is known.
International transfers through postal giro networks

International postal giro refers to credit transfers and withdrawals from or deposits in accounts that are transmitted to or from a foreign country through the international postal giro network.

Countries with a postal giro network have signed correspondent banking agreements among themselves setting out the common procedures to be applied in effecting payments. Finland has concluded an agreement with a total of 15 postal organizations.

Under these agreements, postal organizations have agreed to use the currency of either the remitting or the receiving country in payments effected between the two countries. Usually payments sent to a foreign country from Finland via the international postal giro network are in the currency of the receiving country while payments from a foreign country to Finland are in Finnish markkkaa.

Postal giro payments are transferred to and from abroad by letter, via the teletransmission system or as an express order via telex.

4.2.2 Collections

Payment on open account terms involves considerable risk, both for sellers accepting payment orders or cheques and for buyers making pre-payments. In contrast, companies using documentary credits try to eliminate their risk as far as possible. As regards risk, collections are a method of payment falling between these two extremes as risk is divided between the two parties.

Collections are commonly identified by the abbreviation CAD (Cash Against Documents) and by the terms of payment referring to the release of the documents.

Definition of collections

Banks in both Finland and most other countries have undertaken to observe the 'Uniform Rules for Collections', published by the International Chamber of Commerce (ICC publication No. 322, revised edition of 1978). The rules define collection as the handling by the bank, on instructions received from the customer, of documents in order to:
a) obtain acceptance and/or payment, or
b) deliver commercial documents against acceptance and/or payment, or
c) deliver documents on other terms and conditions.

In addition to collections associated with international trade in goods, banks also provide other foreign collections services, such as collections of payment instruments, securities and earnings on them, foreign tax refunds as well as withdrawals of deposits from foreign banks.

Since the use of collections as a method of payment is based on an existing sales contract, the bank requires that a claim submitted for collection is undisputed. The bank does not take a stand in the event of any disagreements between the parties. The concept of collection should not be confused or equated with domestic collection which refers to the collection of payments that have already fallen due.

The following points concerning the basic principles of CAD may also be mentioned:

— the buyer receives the documents related to the collection from his bank only after he has fulfilled the terms and conditions of the instructions; and
— only documents can be sent for collection — never goods.

Bank’s position in collection procedure

The international rules for collections clearly define the bank’s obligations and liabilities in the handling of collections. Sellers and buyers engaged in international trade should pay attention to at least the following considerations.

— The bank is under no obligation to ensure that the contents of the documents submitted to it comply with the trade agreement.

— The bank presents the documents to the payer only in compliance with the customer’s instructions.

— The bank does not take any legal actions to collect the payment, i.e., as mentioned before, the receivables to be collected must be undisputed.
Companies engaged in foreign trade should be aware that both the remitting bank and the collecting bank are obliged to see that the foreign exchange regulations of their respective countries are not violated.

Documents involved in CAD

There are no regulations as to the type of documents that can be submitted for collection. Normally, the documents relate to international trade in goods and thus the collections usually involve at least one document referring to transportation and the corresponding commercial invoice.

Regardless of the type of documents sent for collection, the buyer or payer always has the possibility and right — even obligation — to check the documents before effecting the payment or accepting a draft.

Charges

When the seller and buyer specify in their trade agreement that the selling price is to be paid in the form of a collection, they must also remember to agree on the party who is to pay the fees and charges of the banks carrying out the collection, ie the remitting bank and the collecting bank.

Terms of payment

When the seller and the buyer choose CAD terms as the method of payment, they must also always specify the terms of payment. Depending on the sales contract, the terms can be D/P (documents against payment), which requires cash payment, or D/A (documents against acceptance), which provides credit.

Instructions concerning protest can be attached to the CAD instructions to secure the claim. The legal significance of protest varies from country to country.

Export collections

From the general description of collections, we now move on to collections related to the export trade, ie export collections. Export
collections are initiated by the exporter, who gives the bank written instructions with documents for collection attached.

On the basis of the instructions, the exporter’s bank (remitting bank) draws up a collection order containing all the necessary instructions for the buyer’s bank (collecting bank) and sends it together with the documents to the foreign bank. On receiving the payment from the buyer, the foreign bank sends the funds to the remitting bank, which credits the exporter’s account with the proceeds as instructed.

Exporter’s (seller’s) position in export collections

By sending the documents of title to the goods for collection through its own bank to the buyer’s bank, the exporter can be sure that the buyer can only take possession of the goods against payment. The collecting bank must observe the instructions it has received.

Regardless of the method of transportation used and the country of destination, the exporter must try to send the collection order to the bank immediately after the delivery has taken place. Thus the documents can be presented to the buyer without delay.

In export collections, the gains and losses arising from changes in exchange rates usually rest with the exporter, unless the exporter has taken them into consideration, for example by including special terms in the sales contract.

Import collections

Collections from the importer’s or buyer’s point of view are called import collections.

The foreign bank, the remitting bank, sends the documents for collection as instructed by the seller to the buyer’s bank. This bank, which thus acts as the collecting bank, advises the payer of the collection immediately. The letter of advice is usually sent to the payer by registered mail or by messenger service. It contains all the information on the CAD transaction that is of interest to the payer.

On receiving the payment — on release of the documents in the case of sight collection (D/P) and on the due date in the case of acceptance collections (D/A) — the collecting bank reimburses the proceeds according to instructions. The seller receives the payment quickly and safely through modern data transmission networks.
Importer’s (payer’s) position in import collections

By choosing import collections as the method of payment, the buyer can be sure of receiving the documents of title to the goods without any problems — provided, of course, that the seller also acts in compliance with the agreement. Regardless of the terms of payment, the buyer always has the possibility and right to check the documents presented for collection.

4.2.3 Documentary credits

A documentary credit (letter of credit, L/C) differs from other methods of payment used in foreign trade in certain crucial respects. Whereas in clean payments or collections the final settlement of the payment as defined in the sales contract depends on the buyer’s ability and willingness to pay, in the case of documentary credit the buyer’s bank also assumes responsibility for payment to the seller. If used correctly, the documentary credit is a method of payment which secures the interests of both the buyer and the seller. In principle, it can be opened in any form as long as both parties have first agreed on the terms. The only restriction is that the terms and rules of the documentary credit must not be contradictory.

The variety and increasingly widespread use of documentary credits have necessitated the formulation of common rules governing documentary credits. For this purpose, the International Chamber of Commerce has drawn up ‘Uniform Customs and Practices for Documentary Credits’, first published in 1933. Today these rules are observed by most banks in more than 160 countries.

What is a documentary credit?

A documentary credit is an arrangement whereby the buyer’s bank (issuing/opening bank), acting at the request and in accordance with the instructions of a customer (applicant), undertakes to effect a payment to a third party (beneficiary) against documents specified in the documentary credit, provided that the terms and conditions of the documentary credit are complied with.

The possible use of a documentary credit should be agreed on by the buyer and the seller when they draw up the sales contract.
When the buyer asks its bank to open a documentary credit in the seller's favour, he submits to the bank an application specifying the terms and conditions of the documentary credit (Figure 2, step 1).

The buyer's bank opens a documentary credit (Figure 2, step 2) by sending a telecommunications message to the advising bank, which informs the seller of the opening of the documentary credit (Figure 2, step 3).

When the documentary credit has been opened in the seller's favour, he studies the terms and conditions to make sure that he can comply with them and that he will, in due course, be able to receive payment against the documents to be presented by him. If the terms and conditions differ from those agreed in the sales contract or if for some other reason the seller cannot accept the documentary credit, he must immediately contact the buyer and ask him to make the necessary changes to the documentary credit. Only after the changes have been made and the documentary credit is in such a form that the seller knows for sure that he can comply with the terms and conditions, can he start to manufacture or ship the goods (Figure 2, step 4).

After delivering the goods, the seller presents the shipping documents and other documents specified in the documentary credit to the advising bank (Figure 2, step 4a). The advising bank checks that
the documents comply with the terms and conditions of the documentary credit. If the bank considers that the terms and conditions of the documentary credit have been fulfilled, it sends the documents to the opening bank (Figure 2, step 5). The opening bank also checks that the documents comply with the terms of the documentary credit and then effects the payment in the manner specified in the documentary credit. The date when the final payment is made to the seller depends on the type of documentary credit.

The opening bank charges the buyer for the amount specified in the documents and releases the documents (Figure 2, step 6).

Main types of documentary credits

There are five main types of documentary credits: irrevocable credits, revocable credits, sight credits, acceptance credits and confirmed credits.

Irrevocable letters of credit

An irrevocable letter of credit is one that cannot be amended or revoked (cancelled) without the consent of all the parties concerned. The opening bank’s obligation to pay is unconditional throughout the validity of the credit.

Revocable letter of credit

A revocable letter of credit can be amended or cancelled prior to the presentation of documents without the consent of the beneficiary or the advising bank. This type of documentary credit is rare because it does not provide the seller with the level of security normally expected of a documentary credit.

Sight credit

The seller receives payment either immediately on presentation of the documents or a few days later, depending on the type of sight credit involved.
Acceptance credit

For example, the opening bank asks the advising bank to accept a draft which must be presented together with the documents complying with the terms and conditions of the documentary credit. By extending time to pay to the buyer with an acceptance credit, the seller can, on presentation of documents, obtain an acceptance which, as a negotiable instrument, can be discounted whenever necessary.

Confirmed credit

The seller often wants not only the opening bank but also the advising bank to be liable for ensuring that he will receive final payment on the basis of a documentary credit. The seller can ask the buyer to instruct his bank to open a documentary credit confirmed by the advising bank. If a documentary credit is confirmed, the advising bank assumes responsibility for payment to the seller in the same way as the opening bank.

5 Technical infrastructure of payment systems and data transmission systems in international payments

5.1 Banks' internal systems

Banks have also incorporated applications for international payments into their computer systems. Payments data are entered into the system either through workstations or received in electronic form from customer systems or the SWIFT network.

During the processing of payments data, the applications calculate markka equivalents for foreign currency amounts, generate account entries, print out various data on vouchers for accounting purposes both for the bank and the customers, store time series data on payments, etc. In addition, they transmit data to the main interest groups, such as customer systems, SWIFT and the Bank of Finland.
5.2 Interbank systems

SWIFT

Today the bulk of international payments messages between banks is transmitted using electronic data transmission techniques. The Society for Worldwide Interbank Financial Telecommunication (SWIFT) was established in 1973 as a cooperative society by financial institutions in different countries. The function of SWIFT is to process interbank messages sent through a data transmission network built and maintained by SWIFT. In addition, SWIFT is responsible for developing the necessary message standards and their further enhancement. Its headquarters are located in Brussels. Finland has participated in the SWIFT system since the very beginning and is one of the 15 founder countries.

Message transmission via SWIFT began in 1977 and all major Finnish banks which were authorized to deal in foreign exchange at the time participated from the outset. At the moment, there are member banks in more than 80 countries and banks in more than 70 of them are linked to the network. The number of member banks is now some 1 800, nearly 1 700 of whom are active users, ie they send and receive messages. Together with the other users (participants, sub-members), comprising mainly independent branches and subsidiaries of member banks, the total number of users exceeds 3 000.

Standard messages developed by SWIFT for various purposes are used for interbank transactions. The data groups, nature (compulsory or voluntary), lengths and format of data are carefully specified for each message type. Message standards have helped to create a common language which facilitates and expedites communication between users. Moreover, they make it possible to automatically process the data contained in the messages in the banks' own information systems, thereby giving rise to significant efficiency and rationalization gains. At the moment, there are more than a hundred different message types, which are classified into ten categories according to their area of utilization.

SWIFT messages are formed either entirely automatically, ie they are generated by the banks' own payment processing systems, as in Finland for example, or semi-manually, whereby the necessary data are fed separately through a terminal into the correct fields of the relevant block of the message.

After automated checking, incoming SWIFT messages are routed for processing to the relevant department in the user organization, as indicated by the message type used. The payments data contained in
the message are transmitted to the bank’s own systems either by inputting them separately or automatically, depending on the service level of the application in question.

SWIFT has installed regional processors for each user country (IRP = Input Regional Processor, ORP = Output Regional Processor). There is a data link between the users in each country and these processors. These automatically operating processors are connected to the SWIFT Slice Processors (SP) located around the world, which, in turn, are connected to each other. This also ensures the availability of backup facilities (Figure 3).

In addition, the system monitors the status of delivered messages by automatically generating notifications to the users concerning, for example, rejected or delayed messages and possible duplicate messages. A message history is created and stored for every message and various statistics are compiled on the breakdown of countries, banks and message types.

Figure 3. Flow diagram for a SWIFT message
As international payments and other transactions involve very large values, special attention has had to be paid to the security of communications. The security of the SWIFT messages is ensured by means of several facilities. Security procedures provided by SWIFT are complemented by those in banks’ own internal information systems. The SWIFT network is closed: only authorized users have access to the network.

In addition to the basic transmission of messages, SWIFT is responsible for maintaining and developing the computer facilities, for making necessary modifications in the standards and for developing new messages types. In addition, SWIFT publishes a collection of handbooks for users, distributes a great deal of other informative material and provides training for users on SWIFT traffic.

The main advantages offered by the SWIFT system to banks are as follows:

— rapid message transmission,
— security for both data communications and individual payments,
— common standards,
— sophisticated automation,
— worldwide network: nearly all the leading countries and banks as regards international funds transfers are already users of the network.

Telex

Although more than 90 per cent of banks’ international transactions are today transmitted over the SWIFT network, telex is used for transfers to and from countries and banks that do not yet belong to the SWIFT system.

A telex connection between banks is verified through an offsetting procedure both when the connection is opened and when it is closed. The actual payment message is verified according to security procedures agreed by the parties.

Compared with SWIFT payments, processing of payments transmitted by telex in the banks’ own information systems is somewhat more time-consuming because machine-readable standards are not used in telex communications. Therefore, bank officers first have to interpret the text and then separately feed the data needed in the payment applications into the systems.
Mailing

Nowadays, it is quite rare to effect interbank payments by mail. Mailing is primarily used when a bank sends a foreign currency cheque to the beneficiary or when documents related to collections or documentary credits are sent. In these latter cases, the actual funds transfers are mainly made via SWIFT. Safe arrival can be ensured by using registered mail or courier services, though the latter are considerably more expensive than postal services.

Teletransmission

Postal giro payments are transferred using teletransmission, an information system developed jointly by the Nordic postal giro authorities.

The development of teletransmission was started at around the time the SWIFT system was being introduced in the late 1970s. Teletransmission refers to the cross-border batch transmission of international postal giro payment data over telephone lines. The Nordic countries were the first to adopt teletransmission and other postal giro countries have gradually joined the system.

The postal giro countries have together developed special products for use in connection with the teletransmission system.

5.3 Systems between customers and banks

Electronic banking services are increasingly being used by companies for the settlement of international payments, although not as widely as for domestic payments.

Electronic banking services save companies' time and labour: they do not need to go to the bank so often, connections to financial management and accounting applications can be automated and there is less need to handle paper documents. These services enable companies to obtain real-time information on their account balances, transactions and foreign exchange markets, and they can use this information to improve the management of their assets. Cost savings are also generated as the prices of electronic services are lower than the fees for services provided at bank branches.

Banks started to offer electronic services for international payments in early 1980s. The first systems were customer terminal systems in which customers communicated via an on-line terminal
with the bank’s mainframe computer application. Data on transactions were also received in the form of magnetic tapes or diskettes. Today, on-line terminal systems and data media have almost entirely been replaced by file transfers via telecommunications networks. The file transfer links have been built either directly on the basis of companies’ own computer systems or using banker software supplied by software companies and banks.

Services

The basic international payment service offered to customers is the international clean payment. The debiting account is a cheque or foreign currency account with a domestic bank and the account which is credited is one with a foreign bank. As Finland does not have an international transactions standard like that used for domestic payments, banks use their own transactions standard or a standard developed by some other bank. An international transaction consists of information on the payer, payee and the currencies involved. Before the payment is effected, the company may have to make a foreign exchange deal with the bank which determines the foreign exchange rates to be applied. The bank supplements the information on an outgoing payment given by the customer with data on the transferring bank. The bank’s systems send customers an electronic statement showing the rates that were used and any rejected transactions. Information that needs to be reported to the Bank of Finland is submitted by banks in electronic form.

Payments by cheque can also be transmitted electronically. They can be sent in form of transactions through the SWIFT network to banks, which then print out the cheques and deliver them to the beneficiary. Alternatively, banks print out the cheques and deliver them to customers for mailing to the beneficiaries. Electronic user interfaces are also being installed in banks for documentary credits and collections.

Instructions for payment orders involving an account with a foreign bank can also be transmitted electronically. Such instructions may pertain to, for example, repatriation of funds or payments to another foreign account.

Banks’ systems can be used to search account statements, balances on accounts, transactions and foreign exchange rates as well as to access various financial information services. A foreign bank can also use the SWIFT network to transmit statements on accounts maintained by a customer with a foreign bank to a Finnish bank, from where the
customer retrieves them using his banker software. As regards incoming foreign payments, banks enter preliminary information in the customer’s account before the items are booked.

Companies can also acquire banker software for a foreign bank and communicate directly with this bank’s systems via telecommunications networks. Similarly, Finnish banks offer their electronic services to users abroad.

Interfaces with other systems

Banker software enables direct links to a company’s own financial management systems. A fairly common practice is to first enter bills into a purchase ledger, from where they are transmitted to the banker software. Decisions to pay, selection of accounts to be debited, the combination of a particular beneficiary’s bills and credit items into payments and the addition of the necessary reporting information for the Bank of Finland are all made within the banker software. In a corresponding fashion, electronic feedback retrieved from banks is transmitted back to the ledger, accounting and other financial management applications.

Security

A user of electronic services makes an agreement with each bank regarding the data that it wants to send to the bank or retrieve from the bank and specifies the accounts concerned. In connection with every transmission and retrieval of data, the user’s right to the requested activities is checked. Banks’ systems also check that the data are received intact in the form that they were sent from the software. A company specifies in the banker software what each individual user is entitled to do. In addition, each telecommunications network applies its own security practices.

Future prospects

Electronic data interchange (EDI) between organizations is increasing constantly, data transmission between banks and companies being a typical example. The standardization of messages at the national and international level is promoting the growth of such data interchange. As regards international payments, it has been agreed that the
EDIFACT standard (Electronic Data Interchange For Administration, Commerce and Transport) will be applied in SWIFT messages between banks.

The general aim of EDI is to reduce the amount of paper documents exchanged. Electronic transactions must therefore include a sufficient amount of information to meet the needs of companies and authorities and thus, for example, avoid the need for banks and companies to send paper documents to each other. The cost savings gained are significant even from the national economy’s perspective. Moreover, with technological advances, electronic data transmission is taking place increasingly smoothly and at such a speed that physical distances are of practically no significance today.
# Clearing and Settlement of Securities Transactions: Description, Regulation and International Recommendations

Maritta Vehmas

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1 Description of clearing and settlement

Clearing and settlement is the process of determining the obligations and claims of counterparties to a securities transaction and fulfilling the resultant delivery and payment obligations.

Depending on the size and nature of the market, clearing and settlement of securities and the related payments can be organized in different ways. The traditional method is trade-for-trade clearing, in which each trade is cleared separately between participants. After clearing, securities are usually delivered against payment. Growth in trading volumes in the international markets and the aim of reducing the risks associated with transactions have led to the introduction of different netting systems. Netting can be applied to the securities to be delivered or payments for them or both. Netting can be bilateral or multilateral.

The transition from a trade-for-trade environment to one employing various netting systems or to a paperless book-entry securities system requires a corporate entity to handle clearing and settlement functions. In many countries these functions are carried out at a central securities depository. They can also be performed by a legally separate clearing corporation, or they can be included in the activities of a marketplace. This latter arrangement does not, however, comply with international recommendations.

The clearing and settlement of securities transactions is usually divided into four stages: confirmation, affirmation, clearing and settlement.

Confirmation refers to the process whereby counterparties' notifications of the details of a trade, eg type, amount and price of the security, are checked. If the counterparties' notifications match, a trade is confirmed. After confirmation, the clearing corporation checks whether the conditions for delivery exist and decides whether to accept the trade for clearing. If the conditions are met, the clearing centre notifies the counterparties that the trade has been affirmed for clearing. Clearing is the process by which the obligations of counterparties to a trade are determined and recorded for delivery. Settlement refers to the fulfilment by the counterparties of the obligations determined in clearing, ie the sellers deliver the securities they have sold to the buyers and the buyers pay the agreed purchase price.

However, a clearing organization does not necessarily handle all four activities; eg confirmation of trades can take place in a
marketplace. A clearing organization's sole function may be to calculate the counterparties' settlement obligations, in which case the counterparties themselves are responsible for the fulfilment of their obligations towards each other. Usually, clearing and settlement are organized so that the clearing organization is responsible in one way or other for the delivery of the securities and the settlement of the corresponding payments. In the derivatives markets, an options corporation is a counterparty to each side of a trade and thus responsible for the execution of trades. In securities transactions, the clearing corporation is not usually a party to a trade; rather, its responsibility is based on a clearing and settlement agreement between the corporation and the parties or on the rules of the corporation.

2 International recommendations for clearing and settlement

With the rapid growth in international securities business, differences in national trading, clearing and settlement systems have given rise to problems. In recent years, several international organizations have issued recommendations for the harmonization of these systems. The recommendations are also aimed at improving the security and efficiency of clearing and settlement procedures and reducing the related risks. The recommendations are, of course, not binding; they merely seek to make national practices more compatible so that the proposed objectives can be attained.

The following organizations have made recommendations related to clearing and settlement: the Group of Thirty (G30), the International Organization of Securities Commissions (IOSCO), the Federation Internationale des Bourses de Valeurs (FIBV), the International Society of Securities Administrators (ISSA) and the European Community (EC).

2.1 Group of Thirty (G30)

The Group of Thirty is an association of thirty private financial institutions which operate in the international financial markets. In spring 1989, the Group published a report with nine recommendations concerning clearing and settlement practices in securities markets. For
each recommendation there is a date by which the recommendations should be implemented. The Group also publishes status reports in which clearing and settlement systems in different countries are compared with the recommendations. The latest status report summarized the situation as at the end of 1992.

The Group of Thirty recommends that trade matching (comparison) should be accomplished at the latest on the first day after the trade date \((T+1)\). In addition to direct market participants (ie securities intermediaries), indirect market participants, such as institutional investors, should be allowed to join a trade comparison system so that the trade details concerning them can be affirmed. Each country should have a central securities depository (CSD) in place by 1992. The establishment of a CSD permits the introduction of clearing and settlement based on a book-entry system, either by dematerialization, ie the elimination of physical certificates, or by immobilization, ie the storage of physical certificates at the CSD.

Each country should determine whether a trade netting system would be beneficial. It should be endeavoured to shorten settlement schedules so that final settlement occurs on the third day after the trade date \((T+3)\). Participants should be encouraged to use securities lending and borrowing as a method of expediting the settlement of securities transactions. Existing regulatory and taxation practices that inhibit the practice of securities lending should be removed. The ISIN (International Securities Identification Number) coding system should be adopted in securities business for the implementation of a uniform coding practice in different countries.

According to the G30 recommendations, all securities transactions should be settled employing the delivery versus payment (DVP) principle and the funds associated with settlement of securities transactions should be available to the payee on the same day as the securities are delivered (the "same day funds" convention). In a book-entry system, this means that an external entity, eg a clearing organization, must be responsible for ensuring that entries indicating changes in ownership are recorded at the same time as buyers effect payment.

2.2 IOSCO

The International Organization of Securities Commissions (IOSCO) published its recommendations in September 1989. The recommendations urge members to compare international recommendations (eg those of the Group of Thirty, EC and FIBV)
with practices in their own national systems and to take steps to promote the introduction of the minimum requirements for clearing, settlement and payment systems in their respective countries. It was further recommended that members should cooperate to ensure adequate security in communications between national clearing, settlement and depository systems.

### 2.3 FIBV

The Federation Internationale des Bourses de Valeurs (FIBV) published its recommendations in June 1989. In them, the organization stated that it accepted the recommendations of the G30, EC and ISSA. National and international central securities depositories were called upon to conclude agreements on establishing communications links between the depositories. This would enable securities to be immobilized at their respective national depositories and clearing and settlement to be carried out in the form of book-entry transfers between different countries. It was recommended that stock exchanges should include a provision in their rules according to which clearing and settlement of trades in foreign securities quoted on these stock exchanges could be carried out in the form of registrations in book-entry accounts by the central depository in the home country of the security concerned or by an international central securities depository.

### 2.4 EC

The Kessler study, commissioned by the EC Commission, focuses on the settlement of cross-border securities transactions. According to the study, all securities transactions should be settled quickly, reliably and cheaply. It recommends that each member country set up a national central depository fulfilling the minimum requirements set forth in the study. The central depository should be independent of market participants, and transactions should be settled at a separate organization outside the marketplace.

Central depositories are urged to increase cooperation among themselves, ie to hold securities in safe custody and administer them for each other and to settle cross-border securities transactions on behalf of each other. However, it is not the intention that the activities of national central depositories should prohibit other types of cross-border settlement. If central depositories cooperate with national
central depositories in non-EC countries and if one country has several depositories, member countries should jointly agree on with which depository in each country they will cooperate.

Central depositories in member states are required to ensure that the delivery versus payment principle is implemented. The aim is that each category of security would be held in safe custody by only one central depository on behalf of the other depositories.

The EC has not issued a directive on the harmonization of member states' legislation on clearing and settlement procedures, partly because the systems in different countries differ substantially from each other. Thus efforts to establish compatible practices are based on international recommendations only.

2.5 ISSA

The International Society of Securities Administrators (ISSA) published recommendations for clearing and settlement in 1988 and 1990, according to which each country should have a central depository and clearing organization. Clearing organizations in different countries are urged to cooperate with each other and to observe uniform practices in their operations. The settlement schedule should not exceed five business days and settlement should be based on rolling settlement and the delivery versus payment principle.

It is further recommended that clearing organizations should seek to study systemic and intermediary risks and take steps to minimize them. Minimum capital and credit rating requirements should be imposed on clearing parties.

If depositories and clearing organizations are not owned and supervised by the government, it is recommended that they should be owned and supervised by their actual users, and that the costs of their operations should be covered by applying the matching convention in accounting.

The recommendations call for the development and expansion of paperless systems but with the proviso that it should always be possible to obtain documentary evidence of ownership, if required. Maximum use should be made of centralized clearing and safekeeping organizations in the home country of securities which are traded in many different countries. The ISIN coding system should be adopted in international securities transactions. A standard format for presenting data on trades should be developed so as to enable the introduction of international matching systems.
2.6 Common principles of the recommendations

Although the international recommendations outlined above differ slightly in terms of their details and terminology, a common way of thinking can readily be discerned in them. All of them call for the establishment of national centralized clearing centres and safekeeping centres meeting certain minimum criteria. Furthermore, they recommend that each category of security should be held in safe custody and cleared and settled at only one depository, which would normally be the central depository in the home country of the security concerned. Central depositories in different countries are expected to cooperate.

The recommendations also consider it important that the period between trade execution and settlement be shortened and that the principle of delivery versus payment be observed. Adoption and compliance with uniform principles and standards would facilitate international securities business and cooperation between national clearing centres.

3 Clearing and settlement in Finland

3.1 Legislation

In Finland, a book-entry securities system was introduced in May 1992. The Act on the Book-Entry Securities System and the Act on Book-Entry Accounts took effect on 1 August 1991.

In a book-entry securities system, physical documents are replaced by entries made using automatic data processing procedures. Legal effects arising from the possession of the document are replaced by legal effects arising from the registration of ownership. Thus, in a book-entry securities system, the delivery of physical certificates is replaced by the registration of a transfer of ownership from the account of the seller to the account of the buyer.

Under the Act on the Book-Entry Securities System, listed companies are required to transfer their shares to the book-entry securities system. Other companies may transfer their shares to the system on a voluntary basis. Other shares and eg unit trust units can be transferred to the book-entry securities system upon application by the issuer and with the permission of the Central Share Register. The
Securities Association decides on the acceptance of new book-entry debt securities, such as bonds and CDs, into the system.

The legislation governing book-entry securities provides the basis for paperless trading. A book-entry securities system is, however, only a registration system for book-entry securities and the related rights. Implementation of a book-entry securities system requires computerization of clearing and settlement activities. In a computerized book-entry securities system it is important for the sake of public trustworthiness that account entries are based on trades which have been executed, cleared and settled correctly. However, the legislation on book-entry securities lacks provisions on the clearing and settlement of trades in book-entry securities; nor are such provisions included in any other legislation.

To remedy this shortcoming the Ministry of Finance appointed a working group on 25 October 1990. The working group was charged with the task of drafting legislation on a clearing and settlement system for securities transactions. The working group submitted its memorandum (Ministry of Finance working group memorandum 1991:18) at the end of May 1991, after which the memorandum was circulated for comment. The working group was required to take into account the main international recommendations for clearing and settlement in its proposal. The working group also investigated the possibility of and need for immobilization of securities and arrangements for securities borrowing and lending.

3.1.1 Proposal by the working group on a law on clearing and settlement

The clearing and settlement working group proposed that a law be enacted on the clearing and settlement of trades in and other transfers of book-entry securities, physical securities and other financial market instruments. The proposed law was to provide a legal framework incorporating key provisions on the pursuit of clearing and settlement activities; it was proposed that more detailed provisions be issued by the clearing corporation itself and included in the rules for clearing and settlement confirmed by the Ministry of Finance. The pursuit of clearing and settlement activities as referred to in the proposal would be subject to authorization by the Ministry of Finance.

The working group proposed that transfers of book-entry securities based on book-entry trades effected by securities brokers using the public trading procedure laid down in the Securities Market Act should be cleared and settled in a clearing organization referred to in
the proposed law. In addition the working group proposed that the law be applied solely to the clearing and settlement activities of a clearing organization which assumes responsibility for delivery of the instrument concerned and settlement of the associated payment. However, if the only task of the clearing organization was to be to calculate the participants’ claims and obligations while the responsibility for delivery, settlement and the related risks rested with the participants themselves, this would not constitute clearing and settlement activities subject to authorization as referred to in the proposed law.

The clearing organization should cover its liabilities with collateral deposited by the clearing parties. In the case of book-entry securities, the pledging of the securities being traded was regarded as a practicable alternative.

It was also proposed that a provision establishing the right of lien be included in the law. According to the provision, the clearing organization would, directly on the basis of the law, have a right of lien to book-entry securities sold or purchased by the clearing party or his customer and held on account of the clearing party in the commission accounts. The right of lien would be valid as collateral for the obligations related to the clearing party’s clearing and settlement activities.

According to the proposal, a clearing centre would be allowed to carry out other activities closely associated with clearing and settlement only on condition that such activities did not jeopardize clearing and settlement activities. In the proposal both a centralized and decentralized system are considered equally possible for the clearing organization. Market participants would decide themselves how clearing and settlement would be organized in practice and how extensively existing systems and organizations would be utilized.

3.1.2 Immobilization

The working group also considered the immobilization of securities. Even after the introduction of the book-entry securities system there are still large numbers of physical certificates, whose handling is laborious and expensive. Immobilization would practically eliminate the need for transfers of physical securities from sellers to buyers because securities would be stored on behalf of the owner at a central depository. Moreover, legal implications arising from the transfer of securities are based on account entries. At present, Finland lacks legislation permitting the immobilization of securities.
There has been one attempt in Finland to use immobilization to solve problems related to backlogs in clearing and settlement systems based on physical securities. In 1988, two commercial banks set up a central securities depository called APC-Keskus Oy. The aim was to immobilize securities at APC-Keskus and to base securities deliveries on book entries. However, the plan had to be abandoned as it would not have been possible to organize these activities in a legally valid manner without amending legislation.

From the point of view of the effectiveness of third party protection it is of crucial importance how the legal possession of securities is acquired and how securities are identified. Immobilization involves collective storage with no need for securities to be physically moved from one place to another in connection with delivery. It must be possible to identify each depositor’s assets held in safe custody by means of account entries in a legally valid way. Consequently, immobilization requires provisions on the legal implications of the registration data on securities held in safe custody. The achievement of adequate legal protection would require the enactment of provisions concerning the delivery of immobilized securities that would be comparable in scope to the book-entry securities legislation.

The establishment of one central securities depository in each country has been proposed in many international recommendations. However, as Finland is already in the process of changing over to a book-entry securities system, the working group did not consider it expedient to recommend the enforcement of such extensive legislation as immobilization would have required. Moreover, the book-entry securities system will render immobilization unnecessary once all physical securities have been converted into book-entry securities.

3.1.3 Securities lending and borrowing

The G30 recommendations included a proposal for the introduction of securities lending and borrowing to safeguard the smooth delivery of securities. In many countries, there are no legal impediments to securities lending and borrowing, and such facilities are widely used by supranational central depositories, e.g. Euroclear.

Securities lending is a procedure whereby an investor (lender) temporarily lends his securities, for a compensation, to a seller who is short of securities at the time of delivery. The seller then delivers the borrowed securities to the buyer. When, in due course, the seller receives the securities in which he was temporarily short he returns
them to the lender. By borrowing the securities in which he is short, the seller avoids sanctions arising from failure to deliver.

In the international securities markets, securities lending is organized on a systematic basis. A lender or a lending pool concludes an agreement with a corporation acting as an intermediary for the lending of securities, according to which certain securities can be lent, whenever necessary, on the terms and conditions specified in the agreement. The corporation may be a clearing organization. The borrower advances collateral to the lender for the full amount of the loan and undertakes to pay a pre-agreed fee. Securities lending and borrowing helps clearing organizations to safeguard delivery and thus to enhance the efficiency of their operations.

Finnish law as such does not prohibit securities lending and borrowing but the kind of arrangement described above would normally be treated as buying and selling of securities and would therefore give rise to taxation and accounting problems. Thus, borrowing and lending might be hampered in practice by unfavourable tax consequences, such as taxation of potential capital gains or double incidence of stamp duty.

Because Finland lacks arrangements for immobilization of securities, securities lending would not be a particularly efficient way of improving the reliability of securities delivery. In a book-entry securities system, however, failed deliveries can be reduced by the provision of securities lending facilities. According to the working group, impediments to securities lending in legislation should be abolished. In its memorandum, the working group proposed that clearing corporations be permitted to carry on securities lending. The working group was unable, on the basis of its terms of reference, to make any other proposals concerning the abolition of impediments against securities lending.

3.1.4 Official comments on the working group’s memorandum

Official reaction to the working group’s memorandum was mixed. Some of the proposals (eg the provision concerning the legal right of lien) were criticized; however, the majority of those authorities asked to comment considered that the proposed law on clearing and settlement was necessary and that it should be put into effect as soon as possible. Some nevertheless took the view that a law on clearing and settlement was unnecessary and proposed that provisions on clearing and settlement should instead be included in the Securities
It is doubtful that the bill will be enacted in the form proposed by the working group; rather, it seems more likely that provisions on clearing and settlement will be included in the Securities Market Act.

### 3.2 Clearing and settlement of book-entry securities transactions in Finland

Although there is, as yet, no statutory regulation of clearing and settlement, with the exception of the derivatives markets, computerized clearing and settlement have already begun in Finland. The first computerized clearing and settlement system operating in a book-entry securities environment was introduced at the Helsinki Money Market Center Ltd at the end of April 1992. Clearing and settlement of transactions in book-entry debt securities undertaken in the money market are carried out in the HMMC’s computer system on the basis of agreements and under clearing and settlement rules mutually agreed on by the participants.

The Helsinki Stock Exchange commenced the centralized clearing and settlement of trades in physical securities in March 1991 and this was followed by clearing and settlement of transactions in book-entry securities in May 1992. In the initial stage, book-entry equity securities quoted on the Helsinki Stock Exchange Automated Trading and Information System (HETI) will be included in this clearing and settlement system. The first listed companies transferred their shares to the book-entry securities system in May 1992. Clearing and settlement are carried out in accordance with the rules of the stock exchange on clearing and settlement for book-entry equities approved by the Ministry of Finance.

According to current plans, there will be two clearing corporations in Finland in the future: one mainly for book-entry equity securities and the other for book-entry money market instruments. This will result in a duplication of operations: both centres perform similar duties and the users of these services are largely the same. The shortcomings in this arrangement have been investigated by the Securities Association, which appointed a working group to consider the matter in 1991.
3.2.1 Recommendation by the working group on clearing and settlement activities appointed by the Securities Association

On 18 April 1991, the Board of the Securities Association appointed a working group on clearing and settlement activities, whose task was to assess the differences and similarities of the book-entry securities clearing systems being developed in Finland and the potential for collaboration between them and to propose ways in which the activities of different clearing systems could be combined, if necessary, in the future.

According to the working group, international recommendations for clearing and settlement of book-entry securities could be better met if the current clearing and settlement arrangements in Finland were organized into one corporation, which would form one legal unit. The corporation would offer clearing and settlement services on the basis of dual operating rules and differentiated division of responsibilities, initially with the aid of two computerized systems. The corporation would be separate from marketplaces and owner registers and would operate in connection with the Securities Association, which is responsible for carrying out the duties of a national book-entry securities centre.

4 Concluding remarks

The absence of legislation on clearing and settlement activities has not prevented the launching of clearing and settlement activities for book-entry securities in Finland. So far, clearing and settlement have been based on self-regulation. Reliability and security of clearing and settlement are essential for a successful book-entry securities system. The efficient functioning of the book-entry securities system requires that book-entry transactions are cleared and settled correctly.

Thus, statutory regulation of clearing and settlement activities should be implemented as soon as possible. Regardless of whether a separate law will be enacted on clearing and settlement or whether provisions will be included in, for instance, the Securities Market Act, the basic principle should be that only clearing organizations that meet international standards and are reliable should be allowed to carry on clearing and settlement activities. Clearing and settlement should be subject to authorization and supervised by the authorities. In
accordance with international recommendations, the principle of delivery versus payment should be implemented in the activities of the clearing organization. Attention should be paid to provisions protecting investors, eg when decisions on collateral are taken.

In view of the size of markets in Finland, it would be well advised, simply for cost reasons, to establish one clearing organization. The clearing organization should be independent of the marketplace. However, further consideration should be given to the question of whether the most suitable place for the clearing organization is in connection with the Securities Association, as the working group on clearing and settlement activities proposed. Under current legislation, clearing and settlement do not belong to the duties of the Securities Association. In the legislation on book-entry securities, the Securities Association has been assigned some key duties, such as certain supervisory rights. In practice, the combined roles of supervisor and practitioner might lead to difficulties and conflicts.
Book-Entry Securities System and Clearing and Settlement of Book-Entry Transactions

Liisa Jauri

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1 Book-entry securities system

1.1 General

Two different paperless systems are used in connection with the holding of securities: immobilized systems and book-entry systems. In an immobilized securities system, physical securities are stored in collective custody and their ownership and other legal relations are recorded in separate accounts. Such a system is in use in Germany, for instance. A book-entry securities system is one in which physical certificates have been dematerialized, i.e., eliminated. Such a system has been in use for some years in Denmark, Norway, Sweden and France and has recently been introduced in Finland.

A book-entry securities system is a computerized system for the holding and registration of securities in which physical securities have been eliminated. The registration of a book-entry security in a book-entry account establishes the rights that previously related to the possession of a physical security. Book-entry accounts are maintained and administered in book-entry registers. Shareholder registers for book-entry shares are kept centrally in a central share register.

There are several reasons underlying the development of systems for processing securities. The handling of paper and coupons is time-consuming, tedious and prone to error. The problem is accentuated at times of heavy trading and issue activity. A paperless system speeds up the clearing and settlement of securities transactions and reduces the costs associated with the payment of dividends and interest and repayments of principal.

1.2 Implementation in Finland

Legislation governing the book-entry securities system came into force in Finland on 1 August 1991. According to the new legislation, all shares, participations and other rights referred to in the Securities Market Act (subsection 1 of section 2 of chapter 1) can be entered in the book-entry securities system. All domestic listed companies are required to join the book-entry system. The shares of these companies are gradually being transferred to the book-entry system by collecting share certificates and replacing them with registrations in accounts. Although companies on the OTC and brokers' lists are not obliged to
transfer their shares to this system, all the companies currently listed on the OTC list and some of those on the brokers' list intend to have their shares entered in the book-entry system. Existing debt instruments issued as physical evidence of ownership cannot be converted into book-entries. Only new debt instruments can be issued in book-entry form.

The book-entry system began operating at the end of April 1992. The first certificate of deposit in book-entry form was issued on 30 April, and the transfer of Kymmene Oy's shares to the book-entry system started on 4 May. On current estimates, all listed companies will have transferred their shares to the system by the end of 1995. Bonds in book-entry form are likely to be issued for the first time in early 1994.

The main parties involved in the system are independent book-entry registrars, the Central Share Register and the Securities Association, which is in charge of the coordination and supervision of the system. With the exception of the state, the Bank of Finland and the Central Share Register, book-entry registers must be licensed by the Ministry of Finance. The book-entry registers keep book-entry accounts and are responsible for entries made in these accounts. The data in the registers enjoy public trustworthiness. With a few exceptions, the registrar's liability is absolute, i.e. strict liability, and concerns both direct and indirect damages.

The Central Share Register maintains central shareholder registers for equity instruments and for combinations of equity and debt instruments. It is also required to maintain a non-commercial book-entry register. This register is maintained at the issuers' expense and contains accounts for those shareholders who do not wish to use a commercial register, such as a bank or a broking firm. Furthermore, it is likely that in the future the Central Share Register will handle at least bonds issued in book-entry form.

The Securities Association is responsible for the development of the system, for issuing regulations and guidelines on its use, for taking measures necessary for ensuring that the system functions in a reliable and appropriate fashion, for supervision of the system and for seeing that the regulations and guidelines issued by it are observed. The Central Share Register and all registrars are members of the Securities Association; membership is obligatory. The Securities Association has subsidiary liability for any damages caused by the system — should a registrar be unable to meet its liability for damages, the Association will pay compensation. The primary source of funds for covering such liabilities is the Association's security fund, though all members of the Association have subsidiary liability.
The legislation on the book-entry securities system does not include provisions concerning technical solutions or the number of registrars; these issues have been left open for the market participants to decide. In the book-entry securities system for equity instruments, there are currently seven legally separate book-entry registers, which are located partly in the same computer and communications environment, partly in separate environments; they transmit data on changes in ownership to the Central Share Register, which maintains shareholder registers and updates them for changes in ownership. Transfers between accounts in different registers are effected through the Central Share Register. The clearing of trades in listed shares is carried out in the same manner, ie the transfers of the relevant book-entry securities from the selling party to the purchasing party are matched trade-for-trade at the Central Share Register. When payment in settlement of a matched trade has been effected, the Central Share Register sends the registers a message requiring them to register the transfer from the seller’s account to the purchaser’s account.

In the book-entry securities system for debt instruments, which is maintained by the Helsinki Money Market Center Ltd, legally separate book-entry registers (which currently number 14) exist in the same computer environment, which is divided by registers into sectors. All transfers between accounts, including those related to the settlement of trades, are effected as double entries from one account to another. The Helsinki Money Market Center functions as a supplier of data-processing and data transmission services related to the maintenance of the book-entry register and as a central clearing organization giving guarantees for payment and delivery to the trading parties.

1.3 Legal implications of account entries

In the book-entry securities system, legal implications related to the possession of a physical certificate are replaced by legal implications arising from an account entry. A basic rule of the book-entry securities system is that book-entry securities and the related rights may only be registered in one account at a time.

A right registered in a book-entry account has precedence over any other right which has not been entered in an account. If several rights are registered in an account, the one which has been entered earlier has precedence. Furthermore, any person who has acquired a book-entry security or received a related right in good faith from an owner registered in an account receives the protection provided by
good faith. Thus entries in book-entry accounts enjoy both positive and negative public trustworthiness. Positive public trustworthiness means that anyone acting in good faith has the right to trust that the rights entered in the book-entry account are valid; negative public trustworthiness means that anyone acting in good faith has the right to trust that rights which have not been entered in the account do not exist.

2 Registration of book-entry transactions

In the book-entry securities system, the registration of trades involving the transfer of book-entry securities from the seller’s account to the purchaser’s account can in principle be effected in two ways: by direct registration or through commission accounts held on the account of intermediaries.

These two registration procedures are described below on the basis of the clearing and settlement systems currently in use, i.e. those of the Helsinki Stock Exchange Co-operative and the Helsinki Money Market Center Ltd. Legal aspects related to collateral and netting are not considered here. At present, direct registration is used only in the settlement of book-entry equities while commission accounts are used for the settlement of both book-entry equity and debt instruments.

2.1 Direct registration

In direct registration, intermediaries, after having divided up the wholesale trade completed on the stock exchange, notify customers’ book-entry registers of the sales and purchases to be registered in book-entry accounts. The selling intermediary requests his customer’s book-entry register to enter an advance registration and a transfer restriction concerning the book-entry securities sold. An advance registration contains the information that the book-entry securities concerned will be transferred to the purchaser’s account on the settlement day in connection with a particular trade; a transfer restriction consists of the information that these book-entry securities may be used solely for effecting the trade concerned. The right to the transfer restriction is held by the selling intermediary. The purchasing
intermediary requests his customer’s book-entry register to enter an advance notification in the customer’s account. Advance notification is not the registration entry referred to in the Act on Book-Entry Accounts; it simply conveys the information that the purchased book-entry securities will be registered in the account on the settlement day in connection with a certain trade. On the basis of the notifications from registers, advance registrations and advance notifications are matched at the Central Share Register with the help of trade codes.

On the settlement day, the payments arising in connection with trades that have been matched according to advance registrations and notifications are effected and the relevant book-entry securities are transferred from one account to another. The purchasing intermediaries pay the clearing organization, which informs the Central Share Register that the payment has been received, and the Central Share Register then sends the registers a notification instructing them to change the advance registrations to final registrations and to make the registrations in accordance with the advance notifications. The registers notify the clearing organization that the registrations have been made, and the clearing organization effects the payment to the selling intermediaries.

Direct registration of payments requires that the purchasing intermediary either receives payment from his customer prior to delivering the book-entry securities or effects the payment out of his own funds and collects the payment from his customer after the book-entry securities have been delivered. In the latter case, it is important from the point of view of the intermediary’s legal redress that the intermediary can guarantee himself the right of retention or a corresponding right because the book-entry securities are entered in the customer’s account before the customer has paid for them. In practice, this can be done by requesting the book-entry register to enter a restriction in the customer’s account, according to which the customer may not transfer the book-entry securities from the account before having transferred funds to the intermediary in settlement of the unpaid trade price, any commission and other fees.

2.2 Commission account registration

A commission account is a commission-related book-entry account, which is held on the account of a securities intermediary. A book-entry security which has been sold or purchased may be registered in the commission account; title to the book-entry security is recorded in the customer files of the securities intermediary concerned.
Notwithstanding the explicit prohibition included in the Securities Market Act, the securities intermediary may pledge the commission account if the arrangement is based on a financing arrangement related to the clearing and settlement of book-entry securities trades and approved by the Securities Association. According to the drafting documents for the law, this is based on the fact that clearing and settlement systems for book-entry securities may have a credit facility attached to them in which the underlying book-entry securities are pledged for credit granted by a financial institution in connection with the settlement of trades.

When the commission account procedure is applied, the selling intermediary, after having executed the trade, requests the book-entry register to transfer the sold book-entry securities to his commission account. Thus the right of possession of the book-entry securities (which in the direct registration procedure is established by entering a transfer restriction in the account) lies with the intermediary. The book-entry securities are transferred from the selling intermediary’s commission account to the purchasing intermediary’s commission account when the selling intermediary receives the payment. The purchasing intermediary may hold the book-entry securities in his commission account until he receives the payment from the customer who purchased the book-entry securities. This allows the intermediary to have a right comparable to the right of retention to safeguard the receivables related to the trade, ie the trade price and other commission and fees.

3 Key principles related to settlement of book-entry transactions

The principle of "delivery versus payment" (DVP) involves linking payment and delivery in a securities transaction together so that payment is not effected without securities being delivered and securities are not delivered without receipt of payment. This principle is designed to safeguard the finality and irrevocability of the effected payment. In addition, the way in which the payment is effected should be neutral for the various parties to the trade. Finality and irrevocability of the payment mean that the payment cannot be revoked (eg if the financial institution used by the payer is declared
bankrupt). Neutrality of the way in which the payment is effected means that all parties to clearing and settlement have equal opportunities to use the chosen payment method.

The principle of "same-day funds" (SDF) means that the recipient of the payment must have the funds available on the day the securities are delivered. This recommendation aims at enhancing the efficiency of clearing and settlement operations and thus of the entire market.

According to international recommendations, clearing and settlement can be speeded up by immobilizing securities at a central securities depository or by using a paperless security system. From the point of view of the DVP and SDF principles, however, the situation is not so straightforward.

When physical certificates are used, it is quite simple to implement the DVP principle: securities are delivered against payment — usually a cheque or a bank draft — and the parties can check that the delivery of the securities and the payment are correct in the same context. In the book-entry securities system, the parties are not necessarily any longer able to carry out these checks; rather, the checking has to be done by the computer system and an independent external party.

The DVP principle requires that payment and delivery are interlinked so that payment is not effected without securities being delivered and securities are not delivered without payment being effected. In the direct registration environment of book-entry equities, this has been accomplished by arranging for an external clearing organization to control the payments and to retain the funds until the book-entry securities have been delivered, and for another external party, ie the Central Share Register, to pass on simultaneous requests to registers to make the necessary registrations, after which payments are effected to the sellers.

The absolute legal requirement in the book-entry securities system according to which a book-entry security may only be registered in one account at a time is accomplished in the direct registration environment of book-entry equity securities in the following way: the Central Share Register requests all registers at the same time to change the advance registrations and advance notifications to final registrations and the registers make these registrations as simultaneously as possible. Technically, this is achieved by the Central Share Register sending the registers an electronic impulse, which initiates a delivery registrations run. In accordance with the DVP principle, the registers notify the clearing organization when the registrations corresponding to the advance registrations and notifications have been completed, and only after this notification does the clearing organization pay the
sellers. This is considered important because only the registers can establish and guarantee that the registrations have actually been made.

In the book-entry security environment of the Helsinki Money Market Center Ltd, the realization of the DVP principle is less complicated. It is achieved through commission accounts in the following way: the clearing organization receives the purchasers' payments, transfers the actual book-entry securities from the selling intermediaries' commission accounts to the purchasing intermediaries' commission accounts and then pays the sellers.
Clearing and Settlement of Money Market Transactions at the Helsinki Money Market Center

Erkki Vehkamäki

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1 Helsinki Money Market Center

1.1 Establishment and members

The Helsinki Money Market Center Ltd (HMMC) was established in summer 1989 following groundwork lasting more than a year. The purpose of the company is to provide its members with clearing and settlement services for transactions in money market instruments and to replace physical documents with computerized register entries.

The need to improve the efficiency of clearing and settlement arrangements arose with the expansion of the money market and process of securitization that followed the Bank of Finland's step-by-step deregulation of interest rates in the period 1983—1986. Rapid growth in the money market, however, did not get under way until the end of 1986 when the Bank of Finland began to conduct open market operations and to issue its own certificates of deposit (CDs). The principal market participants found that manual bilateral clearing and settlement based on paper certificates was slow, administratively cumbersome and lacked adequate security.

Agreement on the requirements that a clearing and settlement centre should meet was reached in early 1989, and the HMMC was established on 1 June 1989 as a joint project of the five largest commercial banks (Kansallis-Osake-Pankki, Union Bank of Finland, Skopbank, Okobank and Postipankki), the state and the Bank of Finland. The Bank of Finland assumed the main responsibility for implementing the project and subscribed a majority of the shares.

In spring 1991, 15 new shareholders were added. Now, all the major direct participants in the money market, ie the largest local (savings and cooperative) banks, all but two of the commercial banks, three foreign banks and two insurance companies are shareholders. Shareholders are entitled to act as counterparties in clearing and settlement activities. The clearing, settlement and register services of the HMMC are also available to annual members or to independent registrars underwritten by a shareholder. The company commenced operations at the end of April 1992.
1.2 Organization

The HMMC seeks to automate its operations as far as possible. Consequently, it has a relatively small staff. A clearing and settlement unit with a staff of four is responsible for ensuring that the actual clearing and settlement functions are carried out smoothly (Figure 1). So far, the operation of the system has required a fairly large number of data-processing staff, which currently stands at 8. The number of administrative, training and information staff is 8.

Figure 1. Organization of the Helsinki Money Market Center
2 Financial market developments

Financial market deregulation was started in the 1980s and was largely completed by the beginning of the 1990s. Probably the most significant factor as regards the development of the financial markets has been the dismantling of exchange controls. For example, the sale abroad of markka-denominated bonds has been permitted since February 1990, and the last remaining regulations were lifted in 1991.

The Finnish money market grew out of the market for short-term funds following the introduction of open market operations by the Bank of Finland. Up until recently, the country has lacked a highly developed bond market. One reason for this has been low yields, due in part to the exemption of interest earnings on bonds from taxation. Activity in the secondary bond market has been virtually non-existent. Housing finance has traditionally been channelled to private persons almost exclusively through banks or in the form of state-subsidized loans. Since the government’s financial position was more or less continually in surplus for a long period up till the end of the 1980s, the central government did not have to resort to bond financing on a large scale.

The situation in the bond market has been changing rapidly, however. The Finnish Housing Fund, established in 1990, has begun issuing its own bonds. As for the central government itself, its financial position has quickly deteriorated during the current recession, and it has had to borrow heavily in domestic and foreign markets.

Otherwise, the expansion of the money market has slowed considerably as compared with the period prior to the establishment of the HMMC. Nonetheless, the amount of CDs outstanding has continued to grow. At the moment, outstanding short-term money market claims total more than FIM 130 billion. The stock of bonds suitable for use as money market instruments amounts to FIM 60–100 billion. Daily gross turnover in the Finnish money market runs in the region of FIM 3 to 6 billion. At times, turnover exceeds FIM 10 billion, as was the case prior to Finland’s decision to link the markka to the ECU in spring 1991 and on the days preceding the devaluation in the autumn of the same year.
3 Key features of the system

3.1 Clearing and settlement

From the very beginning, the internationalization of financial markets was taken into consideration in setting the objectives for the HMMC. The aim was that the HMMC should operate in accordance with international requirements. When the Group of Thirty published its recommendations on international standards and practices in 1989, the HMMC had no difficulty in meeting those that were applicable to it. Though originally designed with the stock market in mind, Finland's legislation on book-entry securities also permits conversion of debt instruments into book-entry form. Nevertheless, the money market had to adjust to modes of operation laid down in the legislation, which does not take into account the special requirements of debt instruments.

3.1.1 Net settlement

The clearing and settlement of trades at the HMMC proceeds in stages (Figure 2). The settlement of transactions takes place on the basis of delivery versus payment, the securities being delivered on the date agreed on by the parties to a trade at the same time as payment is made at the Bank of Finland. Normally, trades are executed with a value date of two days after the trade date. The HMMC also accepts same-day trades or trades whose settlement date is the following day. A condition for same-day settlement is that when the trade is entered in the system it is known that the seller will be in possession of the relevant instruments by the time of settlement and that the buyer can, in addition to paying the purchase price of the underlying instruments, post collateral to cover the price risk and the credit risk associated with any reduction in the principal amount.
Trades are entered into the system by the parties to a trade either from their back offices via workstations provided by the HMMC or directly through their own money market trading systems. The HMMC confirms a trade immediately the system has checked that the terms of the trade as entered by both parties are identical. For trades made one day prior to their settlement date, the system verifies that the seller holds the appropriate instruments in his account or will receive them by the time of settlement. Only trades approved in this way are released for clearing. At the same time, the instruments that have been sold are set aside for delivery and are not available for resale. The new owner may even execute a trade in advance — ie for a trade date later than today’s date — with the exception of same-day trades, for which the trade chain must take place in the right sequence.

At the close of the day preceding settlement, the system executes a clearing run, in which the parties’ ability to pay is ascertained and net obligations are calculated. Net obligations replace gross obligations (claims/ liabilities). At this stage, the system demands collateral from the purchasing party adequate to cover the net price risk attached to the securities and any reduction in the principal amount. In the case of interest rate instruments, price risk arises from possible changes in
interest rates. Reductions in the principal amount, on the other hand, are determined by the category of instrument and the credit rating of the issuer. Once trades have been cleared, each party has one sum due to or from the HMMC. Correspondingly, there is a single delivery obligation or claim for each type of instrument.

The HMMC guarantees payment even if payment disturbances occur between the parties involved. The payment guarantee comes into effect as soon as the trade has been cleared. In the event that a clearing party is unable to pay its net liability, the HMMC grants credit against the collateral described above. A payment guarantee of this kind is essential in a multilateral netting system in order to prevent a breakdown in the chain of trades and thus a general disruption of the markets, i.e., the domino effect. Normally, however, the collateral requirement as such is likely to be sufficient to prevent risk-taking and thus to make recourse to credit unnecessary.

The HMMC’s ability to pay is, in turn, ensured by the Bank of Finland, which can lend funds to the HMMC as a last resort. The shareholders are responsible for the obligations of the HMMC in proportion to their holdings in the company. Thus, in theory, any losses would be distributed between the shareholders in proportion to their shareholding.

Trades which for any reason fail to pass the clearing are automatically transferred to trade-for-trade settlement, where they may still settle on the original settlement day.

3.1.2 Trade-for-trade settlement

Internal trade

A trade with a customer can alternatively be effected as an internal trade in the registrar’s own subregister. These trades are not included in the normal clearing and settlement process and the underlying security is not pledged to the HMMC. The collateral and possession checks and the completion of internal trades are carried out at the end of the settlement day. Trades which are deficient as regards possession of securities are not effected. If book-entry securities are sold from the collateral account of the settlement party, the system also automatically checks the adequacy of collateral.
Rolling trade-for-trade settlement between registers in real time

At the end of 1992, a rolling trade-for-trade settlement procedure was added to the system. In a real-time, rolling trade-for-trade settlement, payment and delivery take place immediately the conditions necessary for the completion of the trade exist. In trade-for-trade settlement, either the current date or some future register date can be agreed on as the settlement date. An uncompleted trade remains in the system for five days after the agreed settlement date, during which time it can also be altered. Advance reservation of securities can also be made, thus preventing short selling. In trade-for-trade settlement, the seller must be in possession of the underlying instrument by the time the trade is completed. The delivery versus payment principle is strictly adhered to in trade-for-trade settlement, because a trade is completed only when all conditions are met, i.e., immediately the buyer has effected the payment and the seller can deliver the instruments.

In trade-for-trade settlement, the buyer may also make a cash deposit in advance in the HMMC’s account at the Bank of Finland either for a certain, specified trade or for trades cleared and settled on a trade-for-trade basis in general without specifying any particular trade or for trades executed from a specific account only. The clearing party may transfer these funds to its own or somebody else’s current account at the Bank of Finland or to the HMMC’s current account in favour of another clearing party. Funds deposited for trades executed from a specific book-entry account may be transferred from that account to another book-entry account. Funds received from a sales transaction may also be left in the book-entry account from which the sale was made and used later for purchases made to the same account. Funds deposited in the HMMC’s current account at the Bank of Finland also serve as collateral in net settlement.

3.2 Monitoring of positions and dissemination of information

In addition to obtaining daily reports and information required by law, parties using the HMMC can monitor their positions on a real-time basis in their own offices. From their position summaries, parties can see, for example, the numbers and values of trades that have been confirmed, released and cleared, the funds required and their own collateral position for each day and the next two days. In unclear situations a clearing party can monitor his position solely in regard to
a particular counterparty or instrument group. Since 1 September 1992, the HMMC has also been disseminating daily market data on turnover, prices and amounts outstanding on Reuters and other electronic information services.

3.3 New issues and maturing items

The changeover to paperless instruments has greatly simplified the issue of new securities, which takes place with the aid of issue accounts. When a bank or the State Treasury acts as a clearing and settlement party, it can issue its own instruments in connection with trades, in which case the system handles all other steps in the process. An issue can even be completed in one day. Up until the daily delivery time, a bank can sell or issue its own instruments maturing on the next day for value on the issue date. The issuance of other instruments must, however, be separately approved by the HMMC. Approval can be obtained immediately, however, provided the issuer has been accepted into the system.

The maturing of outstanding instruments is almost as simple as issuance. The system generates the necessary redemption entries. The issuing financial institution acting as a clearing party must, however, approve the redemption before the system will execute it as part of normal settlement. The system informs the party handling the issue of the total amount that is to be approved.

3.4 Payment flows

The daily flow of payments between clearing parties takes place through the HMMC's current account at the Bank of Finland. As a rule, each party has only one net liability or claim vis-à-vis the HMMC. For the present, payments between customers and clearing parties are initiated by the clearing parties on the basis of the HMMC’s breakdown of payments.

3.5 Structure of registers

The computerized accounts at the HMMC together comprise a single entity, which is divided into individual registers. These registers are
distinct, each being the responsibility of a particular registrar. Account entries are made either automatically as part of the clearing and settlement process on the basis of trades entered into the system or as a separate operation. Generally, a registrar is also a party to clearing, but the system can also be used solely for the safekeeping of instruments in the form of electronic account entries.

Information regarding pledges, recovery proceedings, joint ownership and other such restrictions and rights can be entered into the accounts. The legal status of such entries is defined in the book-entry legislation, which came into force in August 1991. Other instruments do not enjoy similar legal status although, in general, they are treated according to the same principles.

Since the accounts are kept in the same central computer, it is possible to cross register boundaries when necessary. For example, transfers between accounts in separate registers can be carried out on a real time basis. A recipient registrar receives a separate list of transfers from other registers for checking purposes. An account holder can also authorize another registrar (eg his broker) to check that the instruments underlying a trade exist and even to transfer such instruments to another register for trading purposes. Actions involving the crossing of register boundaries also require the consent of registrars so that any legal issues concerning liability can be resolved.

4 Phasing in of instruments

The HMMC started operations on 30 April 1992 by handling discount bank CDs and Treasury bills. In 1994, the system will be extended to include bonds provided the necessary permission is obtained from the Securities Association. This approval, in turn, depends on a minor amendment being made to legislation concerning the safekeeping of securities free of charge. It will then be possible to register both domestic and foreign instruments which are denominated in foreign currencies; at present, the clearing and settlement of foreign currency-denominated trades is only possible in the trade-for-trade settlement procedure.

In the third phase, certain derivative instruments will be admitted to the system. The aim is to include at least forward rate agreements in the system.
Trading, Clearing and Settlement on the Helsinki Stock Exchange

Juha Kaiponen

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1 History of the Helsinki Stock Exchange

In Finland, stock exchange trading dates back to the 1860s. The present Helsinki Stock Exchange was established in 1912. Its rules are based on practices which experience has shown to be suitable for its operations and on a model borrowed from Sweden.

In the period 1912–1935, trading was conducted by open outcry in the stock exchange hall. In 1935, a trading system based on an electric display board was installed in the stock exchange hall. In this calling-out trading method, the chairman of the stock exchange calls out the name of the security to be traded and brokers use a keyboard to tap in their bids and offers, which then appear on the board. A trade is executed when a bid and an offer match. Under the open outcry and calling-out systems, the price level for the whole day was fixed during a fairly short trading period, in accordance with the trading rules.

In 1989 and 1990, a new automated trading and information system called HETI (Helsinki Stock Exchange Automated Trading and Information System) was phased in on the stock exchange. At the same time, the old calling-out system was abandoned.

2 Regulation of stock exchange activities

Activities on the stock exchange are regulated by the 1989 Securities Market Act and the Rules of the Stock Exchange, as confirmed by the Ministry of Finance. In addition, activities of authorized brokerage firms are regulated by the Act on Broking Firms passed in 1989. On the basis of these, the Financial Supervision Authority and the stock exchange supervise brokers and the market. The Financial Supervision Authority is mainly in charge of supervising compliance with legislation and rules.

The Stock Exchange examines companies’ annual and interim reports, listed companies’ press releases and authorized brokerage firms’ annual and semi-annual financial statements. In addition, the stock exchange oversees changes in trade volumes and prices. It also investigates matters concerning listed companies taken up by the media and keeps the market informed in situations where such information is not otherwise made public.
3 Functions and organization of the Helsinki Stock Exchange

3.1 Functions of the Helsinki Stock Exchange

The main function of the stock exchange, as a neutral and independent marketplace, is to maintain an efficient, reliable and competitive secondary market for securities. In addition, the stock exchange provides supervised and centralized clearing and settlement services for securities transactions as well as information and training services. Through the agency of authorized brokerage firms, the stock exchange provides investors with a marketplace where they can buy and sell securities quickly. An efficiently functioning secondary market enables listed companies to use the new issue market to raise risk capital. For the stock exchange to be able to carry out these functions, the following requirements must be met:

- there is a sufficient number of listed companies and authorized brokerage firms,
- the stock exchange is kept technically competitive,
- information on prices, indices and companies in the market is disseminated efficiently,
- compliance with the legislation governing the stock exchange and with the rules of the stock exchange is supervised,
- trading (prices and volume) and the markets (brokers, listed companies and issuers) are supervised.

All participants must be afforded free entry to the market and equal opportunity to receive information on securities and issuers. No single participant must be allowed to control price movements in any security. Information on securities, issuers, matters of general economic significance and the market exchange process is reflected in the market via prices.

3.2 Organization

The highest decision-making body of the stock exchange is the General Meeting of the Cooperative, which elects 18 members to the Supervisory Board. The Supervisory Board elects the Board of Directors, which consists of 8 members.
ANNUAL GENERAL MEETING
OF THE COOPERATIVE
82 members

SUPERVISORY BOARD
18 members

ETHICS COMMITTEE
7 members

BOARD OF DIRECTORS
8 members

EXAMINATION BOARD FOR BROKER'S EXAM
5 members

PRESIDENT

SENIOR VICE PRESIDENT

ADMINISTRATION and ECONOMY

DAILY TRADING and SUPERVISION

CLEARING CENTRE

DATA PROCESSING

INFORMATION and PUBLIC AFFAIRS
The Board of Directors represents the Cooperative and manages its activities unless, according to the Articles of the Cooperative, these duties belong to the Supervisory Board or the President.

In addition, the Board of Directors may, for some special reason, interrupt stock exchange activities for a maximum of one week when the continuance of activities would be contrary to investors' interests.

The activities of the stock exchange are divided into five departments. Two of them — the daily trading and supervision department and the clearing centre — are operative departments.

The main duties of the daily trading and supervision department are:
- management, maintenance and supervision of trading on the stock exchange,
- supervision of listed companies, issuers of bonds, authorized brokerage firms and stock exchange brokers,
- monitoring and development of the rules governing the securities markets and especially those governing the stock exchange.

The clearing centre is in charge of the centralized clearing and settlement of trades in physical securities and book-entry securities and the related collateral management. The finances and administration of the Cooperative are handled by the administration and economy department.

The information department disseminates public information both at home and abroad on the activities of the Helsinki Stock Exchange.

The duties of the data processing department include providing support for the use of stock exchange's operative information systems (the HETI system and the clearing and settlement systems) and participation in projects for the development of systems in cooperation with service bureaux.

3.3 Developments in stock exchange trading

At the end of 1993, the stock exchange list included 77 share series issued by 58 different companies. In addition, there were 567 bond series. Of these, 74 were government bonds, 151 mortgage bank bonds, 59 debentures and 283 other bonds.

Turnover on the stock exchange grew substantially in the 1980s. In 1980, stock exchange turnover amounted to FIM 700 million. Thereafter, it grew rapidly each year, reaching a record level of FIM 40.5 billion in 1989. The small turnover for 1991, FIM 7.7 billion,
reflects the consequences of overheated market conditions and the effect of the overall economic situation on stock market activity.

In 1992, the downward trend in the stock exchange was reversed and turnover rose to FIM 25.7 billion. A new record level was reached in 1993 with turnover of FIM 106.3 billion. Of this amount FIM 46.3 billion represented shares and FIM 60.0 billion bonds. The recovery can be attributed to a sharp fall in interest rates, growth in exports, improved long-term prospects for the economy and foreign investors' increased interest in the Finnish markets.

In spite of the depressed activity on the stock exchange at the beginning of the 1990s and the overheating which preceded it, securitization has reached an advanced stage in Finland and the country is ready to face the challenges of European integration. This, however, will require changes to the regulation of the securities markets, taxation and legislation concerning foreign investors. Some amendments have already been implemented and others are being planned.

Figure 2. Stock exchange turnover, 1980–1993, billion FIM

[Bar graph showing stock exchange turnover from 1980 to 1993.]

1 Restricted shares
2 Non-restricted shares
3 Bonds

The figures for share turnover include subscription rights and warrants.

Source: HSE

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3.4 OTC list and brokers' list

Trading on the OTC list and the brokers' list is carried out in the HETI system of the Helsinki Stock Exchange. The lists are maintained by the Finnish Association of Securities Dealers. At the end of 1993 the OTC list contained a total of 41 share series of 39 companies. The brokers' list had 37 share series of 30 companies. In 1993, turnover on the OTC list was FIM 1.2 billion and on the brokers' list FIM 1.4 billion.

4 The Helsinki Stock Exchange Automated Trading and Information System (HETI)

4.1 Trading system

The Helsinki Stock Exchange has its own computerized trading and information system called HETI (Helsinki Stock Exchange Automated Trading and Information System). The HETI system comprises two parts: a trading system and an information system. The system was phased in during 1989 and 1990.

Trading in the HETI system is fully automated. The system automatically matches bids and offers which meet and executes them as trades. Trading is carried out via terminals in the offices of authorized brokerage firms.

Information on trading in various securities is transmitted directly from the trading system to the information system and from there to the subscribers to the system (Figure 3).

4.2 Information system

The HETI system generates both real-time and batch-mode information on trading on the stock exchange, the OTC list and the brokers' list. Besides information on the domestic market, the system provides up-to-date data on trading on other Nordic stock exchanges.
### The HETI trading system: daily schedule • shares

#### OPENING (PRE-TRADING)

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.30 to 9.50 am</td>
<td>Input of opening bids and offers. An opening bid or offer may not deviate more than a maximum of +/- 15 per cent from the reference price (i.e., the last trading price/the last buying or selling price prior to the trading day concerned). Amount of bid or offer: a minimum of one round lot, a maximum of 10 round lots. Fixing of opening prices (level of prices and trading) for each share on the basis of currently valid bids and offers. Matching of compatible bids and offers and execution of matched trades: unmatched bids and offers are transferred to continuous trading as bids and offers.</td>
</tr>
<tr>
<td>9.50 to 10.00 am</td>
<td>Matching</td>
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#### CONTINUOUS TRADING

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<th>Activity</th>
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</thead>
<tbody>
<tr>
<td>10.00 am 4.00 pm</td>
<td>Compatible bids and offers are matched and executed in real-time as trades. Level of prices and trading may deviate by a maximum of +/- 15 per cent from the reference price (i.e., the last trading price/the last buying or selling price prior to the trading day concerned). Minimum amount of trade: one round lot.</td>
</tr>
</tbody>
</table>

#### AFTER-HOURS TRADING I

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.05 to 5.05 pm</td>
<td>No automatic matching; the buyer enters and the seller confirms the trade. The price is 1) the price according to the closing prices that day or a price in between them or 2) the execution price used in continuous trading or a price between the execution price and the closing price if the execution price is lower than the closing buying price or higher than the closing selling price. Minimum amount of trade: one share.</td>
</tr>
</tbody>
</table>

#### AFTER-HOURS TRADING II

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.00 to 8.25 am (next day)</td>
<td>The best offers remain valid for five minutes and are binding for the brokers who have made them during that time.</td>
</tr>
</tbody>
</table>

#### Closing prices

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.00 pm</td>
<td>No automatic matching; the buyer enters and the seller confirms the trade. The price is 1) the price according to the closing prices that day or a price in between them or 2) the execution price used in continuous trading or a price between the execution price and the closing price if the execution price is lower than the closing buying price or higher than the closing selling price. Minimum amount of trade: one share.</td>
</tr>
</tbody>
</table>
The system continuously transmits real-time information on trading in the form of single messages. Trading information is provided on shares, subscription rights, warrants, convertible bonds, bonds with equity warrants and other bonds. Data on trades executed, closing prices, highest bids and offers and the stock exchange’s price and yield indices (HEX), which are calculated every two minutes, are updated in real time.

The system also generates information in batch mode on various daily and monthly statistics. Official lists of quotations, figures on turnover and trading protocols for shares and bonds are generated daily. Basic data on shares and bonds, including denomination, have also been entered in the HETI system.

5 Clearing and settlement systems

5.1 Clearing and settlement of trades in physical securities

Clearing and settlement of trades in physical securities refers here to the service provided by the stock exchange. Its aim is to determine the obligations and claims arising to the various parties from a securities trade and to fulfil the related delivery and payment obligations.

5.1.1 Delivery of securities

In the past, authorized brokerage firms used to clear and settle trades executed on the stock exchange bilaterally. In March 1991, the stock exchange introduced a centralized clearing and settlement system for securities transactions. Clearing and settlement is carried out using an automatic data processing system leased by the stock exchange.

The clearing and settlement system for stock exchange trades is based on the netting of the trades by each broker in each share series on a particular trade date (T). The difference thus obtained between the sum of securities purchased and sold indicates how many securities of each type each broker is obliged to deliver or receive. Settlement and delivery take place on the fourth business day after the trade date (T+4).

Brokers deliver all the securities they are obliged to deliver on the basis of netting to the clearing centre of the stock exchange by 10.30
am on the settlement date (T+4). Brokers receive payment only against delivery of securities at the clearing centre. Brokers who are obliged to take delivery of securities on the basis of netting must pay for them by 1.30 pm on the same day.

5.1.2 Settlement of payments

A broker’s daily payment obligation is determined as the difference between the sum totals of securities purchased and sold. The combined sum of the payments for the securities which the broker must deliver to the clearing centre represents the broker’s total payment claim. The clearing centre pays the sum due to the broker in the form of a cheque or a credit transfer against the securities at 11 am on the settlement date (T+4).

The combined sum of the payments for the securities which the broker is required to take delivery of at the clearing centre represents the broker’s total payment obligation. The clearing centre releases the securities to the broker when the payment obligation has been fulfilled (by bank draft, cheque or credit transfer) at 2 pm on the settlement date (T+4).

5.2 Clearing and settlement of trades in book-entry securities

5.2.1 Transfer to the book-entry securities system

Dematerialization of physical securities started in spring 1992 with the step-by-step conversion of share certificates into book-entry securities, which are registrations of ownership in computerized registers. At the beginning of May 1992, the stock exchange launched a new computerized system (KATI system) for the clearing and settlement of book-entry securities.

The aim is that the clearing and settlement of book-entry securities should be completed within a shorter time frame than that of physical securities. The settlement time will be shortened to three (T+3) or two days (T+2) after the trade date in the near future.
5.2.2 Trade date

On the trade date (T), a broker receives orders from his customer to buy or sell book-entry securities. In the case of a sell order, the broker may enter a reservation to sell in his customer’s book-entry account. On the basis of the orders, the broker executes trades on the stock exchange and divides up the executed trades in his own customer system according to the different client orders. The division generates registration requests concerning advance registrations of trades in customers’ book-entry accounts.

An advance registration of a purchase indicates the amount of book-entry securities due to be registered in the customer’s account. An advance registration of a sale can be either a transfer restriction entered in the customer’s account or a transfer of book-entry securities to the commission account. The broker deals with those book-entry registrars with whom his customers’ book-entry accounts are kept. Data on trades concluded between brokers are transmitted to the clearing organization’s data system to await settlement.

5.2.3 Settlement date

On the settlement date (T+4), the registers make the transfers of ownership of book-entry securities from the sellers’ accounts and the commission accounts of the sellers’ brokers to the buyers’ accounts or their brokers’ commission accounts. In practice, this is done by confirming that advance registrations are now final registrations.

However, these registrations concerning changes in the ownership of book-entry securities are not made until it has been established that payment for the securities has been effected in accordance with the principle of ‘delivery versus payment’.

To guarantee the fulfilment of the payment obligation, the broker must deposit collateral with the clearing centre of the stock exchange by 10 am on the settlement date.

5.2.4 Delivery versus payment

At 11 am on the settlement date, the clearing centre calculates the final payment obligation for each broker on the basis of cleared trades at that time (Figure 4, step 1). A broker, who, according to the netting calculation, has a payment obligation to the stock exchange effects the payment to the clearing centre by 11.30 am (Figure 4, step 2). If the
commission account of the buying broker has been pledged to the clearing centre as collateral for the fulfilment of his payment obligation, the clearing centre releases the pledge immediately upon receipt of the payment.

After having received the brokers' payments (Figure 4, step 2a), the clearing centre provides the book-entry registers, via the Central Share Register, with feedback data (Figure 4, step 3) on the trades which were approved for settlement at the settlement time (11 am). The book-entry registers automatically confirm advance registrations made in the book-entry accounts as final registrations. At the same time, registrations are also made in the register of share owners kept by the Central Share Register, which corresponds to the shareholder registers previously maintained by companies. Brokers receive data on settled trades through the clearing centre's computer system.

By 1.30 pm on the same day, the clearing centre credits (Figure 4, step 4) those clearing parties, who, on the basis of netting, have claims on the clearing centre (Figure 4, step 5).

Should a broker fail to fulfil his payment obligation, the clearing centre is entitled to take immediate action to safeguard its claims.

Figure 4. Settlement of payments for book-entry securities
5.2.5 Payment flows

Since September 1992, the payment flows related to the settlement of book-entry securities transactions have been handled in the Bank of Finland’s current account system.

The stock exchange has an account with the Bank of Finland. Each broker must either have their own account with the Bank of Finland or agree on their payments being handled by another party which has a current account with the Bank of Finland.

Brokers’ payments related to book-entry security transactions and other transfers to be settled on a particular trading day are netted multilaterally. Transfers of book-entry securities are not netted.

A broker’s net payment related to transactions accepted for settlement on a particular trading day is calculated by deducting the combined sum of the broker’s purchases from the combined sum of his sales. If the difference is negative, the broker is obliged to pay the sum concerned to the clearing organization. If the difference is positive, the clearing organization is obliged to pay the sum concerned to the party.

A broker with a net payment obligation must transfer the requisite funds to the clearing organization’s current account by the prescribed time either directly from his own account or through a third party. After this, the clearing organization credits the current accounts of those brokers with a net claim on the clearing organization. If a broker does not have a current account of his own, the clearing organization will credit the current account of the party specified by the broker.

The clearing organization may also transfer the sum due to the broker or part of it to the current account of another party in accordance with the broker’s instructions. This makes it possible for the broker to flexibly transfer the funds for crediting his customers’ accounts with different banking groups.
6 Future development of the stock market

The stock market provides Finnish companies with a source of risk capital and investors with a range of alternative investment outlets. An efficient and competitive market requires the smooth functioning of marketplaces and the book-entry securities system and close and frictionless cooperation between them. This helps to keep in check the costs incurred at different stages of the exchange process.

Stock exchanges in Europe are stepping up their cooperation as integration advances. Three dominant areas for capital markets are emerging: Europe, North America and the Far East. The Helsinki Stock Exchange is involved in international cooperation both with the Nordic countries and with European countries; the stock exchanges involved are planning to organize cross-border trading, clearing and settlement facilities.

Properly functioning domestic markets are an essential requirement for operations in international markets. Cooperation should aim at the efficient supply of risk capital and alternative types of investment on competitive terms both in domestic and international markets.
Standardized Derivatives: Trading and Clearing
Jan Forsbom — Timo Laitinen

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1 Introduction

Trading in standardized derivatives began in Chicago in 1973 (Chicago Board Options Exchange) with stock-related call options. Next, put options and futures were launched in the United States and new underlying assets were introduced continually. Today, trading in standardized derivatives has spread virtually all over the world. Besides individual shares and stock indices, the most common underlying assets are interest rate and currency instruments and commodities.

In Finland, trading in standardized derivatives began in October 1987. In May 1988, the Finnish Options Market (FOM) started trading in stock index options and futures based on the FOX index. The FOX index is a real-time index calculated by the FOM on the basis of the 25 most traded share series on the Helsinki Stock Exchange. Hence, movements in the FOX index reflect changes in the values of a diversified portfolio comprised of Finnish shares. In addition to stock index derivatives, standardized derivatives traded on Finnish derivatives exchanges have been based on individual shares and foreign currencies.

The 1988 Act on Trading in Standardized Options and Futures (772/88) describes the standardization of derivatives as a procedure whereby an options exchange defines the terms and conditions for the trading and clearing of derivatives in its rules, as approved by the Ministry of Finance. The Act lays down that an options exchange is an organization functioning as an exchange or as a clearing house or both. The activities of an options exchange are subject to licence; licences are granted by the Ministry of Finance. In addition, the Financial Supervision Authority supervises the activities of options exchanges and issues guidelines governing their activities.

In Finland, derivatives which have not been standardized by an options exchange may not be offered as investment vehicles to investors who are not engaged in business. According to the above-mentioned Act, an options trade refers to the meeting of bid and offer prices for a standardized option or future, whereupon the parties are required to enter into contracts with the options exchange for each side of the transaction. The entering into contracts with the buyer and seller when the prices they offer match is referred to as options clearing in the Act.

In Finland, non-standardized contracts for eg interest rate and currency instruments are traded in the interbank market. The Act does not apply to these products, except for the restriction noted above concerning the sale of non-standardized derivatives. Though it is possible to apply standard terms to non-standardized contracts by
mutual agreement between the parties, standardization in a legal sense can only be carried out by an options exchange.

Derivatives are used in capital markets to redistribute risk (i.e., the chance of making a profit or a loss). Since changes in the value of derivatives depend on movements in the prices of the underlying assets, derivatives contracts can be combined with, e.g., an investor's share portfolio so as to minimize the loss arising from any fall in the value of the portfolio or to increase the return on the portfolio. Derivatives based on an index depicting price movements in a number of shares also reduce the trading costs of a diversified portfolio, make it possible to control the investment risk even in rapidly changing market conditions, increase liquidity and provide supplementary information on the stock market. Since the capital tied up in options is on average only a small percentage of the value of the underlying asset, relative movements in options prices are many times greater than those in the underlying stock. This leverage effect enables the investor to hedge even a large portfolio or to seek significant additional profits by means of a relatively small investment.

Standardized derivatives contracts can be either options or futures. In the case of options, the buying party obtains from the selling party, against compensation, the right to buy (call option) or sell (put option) the underlying asset in the future at a price fixed at the time the deal is struck. Depending on the terms of a contract, the buyer may exercise the option at any time before maturity (American-style option) or only on the expiration day (European-style option). The buyer of an option is called the holder and the seller the writer. The price which the holder pays the writer for the right carried by the option is called the premium. The pre-agreed price at which the underlying asset can be bought or sold is called the strike or exercise price.

Depending on the product specifications, it may be possible to replace the delivery of the underlying asset by a cash settlement, which is the practice applied to FOX (Finnish Options Index) derivatives. In such cases, e.g., the stock underlying the derivatives contract is not actually delivered when the contract is exercised; instead, the difference between the exercise price of an option on the underlying stock and the current market price of the stock is replaced by a cash settlement. An options contract may also be closed out before maturity by means of an offsetting options contract, whereby the rights and obligations relating to the contracts cancel out each other. When an option is closed out, the holder writes an identical option or the option writer buys an identical option. The outcome of such a transaction is the difference between the premium paid for
buying the option and the premium received from writing the option. With the exception of the premium, all the terms and conditions of standardized options contracts are standardized in the product specifications of the options exchange. On the options exchange, the buying and selling parties agree on the premium, ie the price of the option, by quoting prices for the same (specified) option to the marketplace.

Where futures contracts are concerned, both the buyer and seller undertake to buy or sell a specified quantity of eg the stock underlying the contract at a price and at a time in the future fixed at the time the deal is struck. In contrast to options contracts, neither the buyer nor the seller of a futures contract has the right to choose whether the contract will be exercised or not (ie to take delivery of or to deliver the underlying). For this reason, the futures buyer does not pay the seller a fee comparable to a premium. Futures cannot be exercised before their expiry. However, by purchasing an identical offsetting futures contract, the buyer can lock in his position in a fashion similar to that of closing out an options contract. A futures contract is settled on the basis of the expiration day, whereas premiums for options are settled on the basis of the trading day.

Profits or losses on futures and options are realized when the contracts expire, or before expiry, if an option is closed out or a futures contract is locked in. The difference between the price of an underlying asset fixed in the derivatives contract and its market price on the expiration day determines the economic outcome of the contract, ie profit or loss. In the case of options, the premium paid or received upfront must also be taken into consideration. When derivatives contracts are used together with eg a share portfolio, the outcome is viewed as a whole; thus derivatives purchased eg for hedging purposes are comparable to insurance premiums for the holder of the portfolio. Likewise, strategies can be constructed by combining different derivatives, in which case changes in the value of the entire position must be treated as a whole.

2 Finnish Options Market Ltd

Finnish Options Market Ltd (FOM) is an options exchange operating in compliance with the Act on Trading in Standardized Options and Futures (772/88). The FOM functions both as an exchange and a clearing house; a licence granted by the Ministry of Finance is required for both activities. Since the trading and clearing of standardized derivatives are based on an electronic book-entry system,
the FOM also acts as custodian of the rights and obligations related to derivatives contracts.

Derivatives are neither physical securities nor book-entry securities as defined in the legislation on book-entry systems. Standardized derivatives are nevertheless often treated in the same way as physical securities and book-entry securities in legislation on investment services and securities markets. The rights and obligations pertaining to derivatives are based solely on account entries made in the data system of the options exchange.

Besides the Act on Trading in Standardized Options and Futures, the activities of an options exchange are governed by its own rules, which must be approved by the Ministry of Finance. All Finnish securities brokers as well as foreign securities brokers licensed by the Ministry of Finance are permitted to act as intermediaries on an options exchange. In addition to the above Act, the activities of securities brokers are regulated by the 1989 Securities Broking Firms Act (499/89) and provisions laid down in the 1989 Securities Market Act (495/89). Brokers execute orders on behalf of end-customers or make bids and offers for their own account. Market makers, the other group participating on an options exchange, carry on trade solely for their own account (Figure 1).

Figure 1. The Activities of Finnish Options Market Ltd
Marker makers undertake to quote two-way binding prices for specified contracts traded on the FOM according to pre-agreed terms. The terms cover quotation size and maximum spreads between bids and offers. Hence, market makers help to improve liquidity in the derivatives markets. Through their operations, market makers match requirements of investors operating in the market at different times. In addition, market makers increase the correctness and publicity of price formation. In return for the services they provide, market makers may operate at low transaction costs in the market.

Trading on the FOM takes place anonymously; the identity of brokers and market makers is not revealed in connection with bids/offers or trades. All trades are registered in either the broker’s or the market maker’s own clearing account, the broker’s daily account or the clearing account of the customer whom the broker represents. A broker may enter all trades which he executes in his own name or on behalf of his customers in the daily account, but they must be distributed to the relevant clearing accounts by the end of the same trading day. Clearing accounts are identified only by clearing account codes, which guarantees that the identity of the customers represented by brokers remains unknown to the options exchange. Trading on the FOM is based on an electronic system, supplemented by telephone negotiations between FOM brokers.

3 Clearing at Finnish Options Market Ltd

3.1 Clearing principles

Like other options exchanges in the Nordic countries, the FOM operates as an integrated exchange and clearing house, although also Finnish law permits clearing to be arranged within a separate organization. The FOM can only accept derivatives executed on an options exchange for clearing. However, an options exchange may handle the clearing of securities and interest rate contracts, within any limits set by the Ministry of Finance. So far, the FOM has only handled the clearing of its own derivatives. It may be noted that the Stockholm Options Market (SOM) handles the clearing of long-term and short-term interest rate derivatives, even though these contracts are entered into elsewhere.
The requirement that the options exchange must enter into contracts for opposite sides of a trade as soon as a bid and an offer match is designed to emphasize the liability of the clearing house and ensure that the rights and obligations arising from derivative contracts are fulfilled. Formally, the clearing house assumes the role of the seller to all buyers and the buyer to all sellers, whereby all the rights and obligations of the transaction focus on the clearing house. Unlike a broker or a market maker, however, the clearing house may not have an open position of its own; rather the identical contracts which the clearing house enters into for each side of a transaction must cancel out each other. For the same reason, the clearing house is never registered in a derivatives account as a party to a contract.

This arrangement effectively removes the counterparty risk from derivatives transactions since a party to a contract is not, for example, dependent on the solvency of the party that made the original bid/offer. Similarly, he is not obliged to obtain the approval of the other party, should he, for example, wish to close out his original position during the validity of the contract. Hence, by stepping in as the buyer to the seller and the seller to the buyer the clearing house both ensures that the rights and obligations pertaining to the trade are fulfilled and the existence of a neutral and anonymous secondary market for standardized derivatives.

3.2 Liability

The only obligation that an options contract imposes on a party to the contract and the broker representing him with respect to the party that made the matching bid/offer or the broker representing him is to pass the trade over to the clearing house for clearing. Hence, an options trade does not give rise to any legal contract or payment obligation between the counterparties or the brokers involved.

Counterparties are, however, required to clear transactions at the options exchange, and as a consequence two offsetting contracts arise. For example, in the case of an options contract, the seller is the options writer and the clearing house is the holder of the option, whereas the buyer is the holder of the option and the clearing house the writer. The liability of the clearing house for the rights and obligations related to the options or futures contract arises from the moment the contract is registered in the clearing account. The liability of the options exchange focuses on the holder of the clearing account, even though the broker is required to act as the representative of the end-customer. The broker is responsible on his own and his
customer's behalf for the fulfilment of the obligations associated with the options or futures which have been registered in his customer's clearing account. Similarly, the holder of a clearing account — be it the broker, the broker's customer or the market maker — is responsible for the fulfilment of the obligations associated with a contract which has been registered in a clearing account.

3.3 Management of clearing risk

The management of the risks associated with the clearing of standardized derivatives is carried out at several levels. The capital adequacy regulations and restrictions on activities laid down in law, licensing requirements and supervision by the authorities ensure that an options exchange has a certain minimum financial capacity and a reliable clearing system. For example, under current law a clearing house is required to have a minimum share capital of FIM 10 million and, in addition an options exchange's total equity capital must be at least one hundredth of the combined open interest at the options exchange. Open interest refers to the liabilities arising from the outstanding amount of options written and from open futures contracts. The open interest of a clearing house is obtained by combining the open interest associated with the various underlying assets. This is done by multiplying the open positions for an instrument by the market value of the underlying asset and a coefficient set by the Financial Supervision Authority; the exposures for the individual underlying assets obtained in this way are then added together.

In a similar fashion, the financial soundness and activities of the brokers and market makers who have a direct agreement with the FOM are regulated by the exchange and are subject to supervision by the authorities. As the options exchange is responsible to clearing account holders for the execution of their rights and obligations in connection with derivatives contracts and the brokers are responsible for their own as well as their customer's transactions, the financial soundness of these firms ultimately ensures the realibility of the clearing system. The FOM monitors the size of the brokers' and market makers' open interest in real time by means of a position risk monitoring program, and the total amount of the open interest of these parties must be in a certain proportion to the value of the collateral and other liquid assets deposited by them. In addition, the rules of the FOM permit it to establish a separate clearing fund, though so far this has not been done.
The reliability of the clearing house is guaranteed in the first place by the collateral required from the parties during the validity period of a derivatives contract. All derivative contracts which, if exercised or closed out, could involve a liability must be backed by collateral. The FOM fixes the collateral, or margin, requirement for each clearing account daily using its risk management model, and the collateral must be deposited in the custodian bank at 11 am on the business day following the day of calculation. The margin requirement determined by the risk management model represents the highest possible cost of closing out the position. The margin requirement is obtained by calculating the cost of closing out the total position, using predetermined parameters, at a point where the value of the position is the lowest possible.

During the time it has been in operation, the FOM has not incurred any credit losses or other losses, although some of the brokers and market makers have ceased operations for financial reasons.

3.4 Clearing procedure

Since the FOM operates both as an exchange and a clearing house, the first stage in clearing — matching — takes place in the marketplace forming part of the FOM’s options exchange activities. In matching, the terms and conditions of the trade are specified with respect to options series, size and premium in the case of options, and the future series, size and the exercise price in the case of futures. The broker or market maker who has made the bid/offer is identified as a party to the trade. The broker can also make his customer’s bid/offer directly, using his customer’s clearing account number. All other terms and conditions of derivatives contracts are laid down in the Rules of the Finnish Options Market and the product specifications included in them.

Since it is essential for the reliability and impartiality of the market that information is provided on all trades executed, the FOM disseminates real-time information on the instrument, the size, the price and the time the trade was executed. The information is made available on many different information systems.

Acceptance of a contract for clearing becomes evident when the contract is registered in the clearing accounts of the clearing house’s information system. Acceptance requires that the broker or market maker has submitted the contract for clearing and that the contract is based on a trade made at the same options exchange or at another exchange whose contracts the clearing house has undertaken to clear.
At the FOM, contracts are irrevocably transferred to clearing by 5 pm on the same trading day, by which time the broker must have distributed the customer trades in his daily account to the relevant customers' clearing accounts. Prior to this, it is possible to cancel a trade which may have been made during the day on the basis of an erroneous bid/offer, provided that the requirements set out in the FOM's code of conduct are fulfilled.

After acceptance, trades are sent for clearing, the purpose of which is to determine the obligations of the parties arising from the executed trades. In the clearing, the payments, fees, possible margin requirements, the party's overall positions and the value of the position resulting from the trades and positions are specified.

During the last stage of the clearing procedure, i.e. continuous rolling settlement, the parties fulfill the obligations determined in the clearing of options and futures, i.e. they pay the premiums and fees and deposit collateral, though in the case of futures no payments are involved at this stage.

A similar clearing procedure is applied when the contracts are exercised. Some options contracts can be exercised during their validity period, but normally options and futures are exercised on their expiration day. Of course, an option can simply expire at the end of the expiration day without being exercised. From the point of view of clearing, an options contract which is exercised corresponds to a trade which is immediately transferred to clearing, i.e. for determining the obligations attached to it. In the final stage, the parties carry out the settlement of the exercised contract, paying the fees and payments associated with the exercise of the contract and delivering the underlying instrument. The delivery of the underlying asset is often replaced by a cash (net value) settlement. Immediately after the delivery has been effected, the FOM releases the collateral put up as security for the contract.

The safekeeping of collateral in connection with derivatives contracts is arranged in cooperation with the banks that act as custodian banks. Brokers' customers, brokers and market makers must deposit a sufficient amount of acceptable collateral with custodian bankers to meet the margin requirement calculated on the basis of the overall position in the clearing account at the end of each trading day. In addition, the FOM itself acts an impartial custodian bank for the holding of collateral. All assets and commitments defined in the rules of the FOM can be used as collateral, applying the valuation criteria laid down in the rules. With certain restrictions defined in the rules of the FOM, assets accepted as collateral include cash deposits, bank
guarantees, credit insurance, bonds, listed shares and certificates of deposit.

The payments resulting from trading in FOX (stock index), FRX (currency) and STOX (individual shares) derivatives at the FOM are netted in respect of each broker and market maker. When FOX and FRX instruments are exercised as cash settlements, the cash transactions associated with the exercising of the instruments are further netted with other transactions. STOX derivatives are exercised by delivering the underlying stocks.

Some 500 000 — 1 000 000 derivatives contracts a year, ie an average of 2 000 — 4 000 contracts a day, were cleared at the FOM in 1989 — 1993 (Figure 2). By multiplying the volume of contracts by the average market value of the underlying instrument, a clearer picture of the size of the derivatives markets can be obtained. Calculated in this way, the derivatives markets have annually transferred price risk associated with shares to a total value of some FIM 30 — 60 billion. The daily trading volume of FOX and STOX options and futures has been up to 10 times the volume of the trade in underlying instruments; this must be regarded as a high value by international standards. Recently, the underlying value of FOX and STOX derivatives has been roughly half the value of public trading in the underlying.

Figure 2. Quarterly trading volumes of options and futures at the FOM, 1989—1993

No. of contracts
3.5 Payments

Cash transactions between the FOM and brokers or market makers arising from the clearing of derivatives contracts are settled on the basis of multilateral netting. On each payment day, brokers and market makers either receive a payment from the FOM or effect a payment to the FOM. If a broker trades for his own account, the cash transactions arising from this trade are combined with those arising from his customers’ trade. Payments are made into bank accounts held by the FOM, brokers and market makers in different banks.

The vast majority of the cash transactions passing through the FOM’s bank accounts merely represent flows of funds from buyers to sellers. It has, however, proved rather difficult to execute such transactions in the course of the same business day through the payment system in Finland. As incoming payments can be made into any of the FOM’s bank accounts with the five different banking groups and outgoing payments are made to bank accounts designated by the receiving brokers and market makers, the FOM has to arrange daily transfers of covering funds between the different banking groups. In practice, funds are transferred from one bank to another by cheque. In addition to the laborious task of ensuring that there are adequate funds in these bank accounts, problems arise when incoming payments fail to be duly entered in the respective bank accounts because of delays or errors.

The value of the payments passing through the FOM’s clearing has ranged from FIM 500 million to FIM 1 500 million a year and from FIM 0.5 million to FIM 100 million a day.

3.6 Clearing and settlement: documentation and execution

Clearing and settlement at the FOM can be described with the aid of the following documents outputted by the system and sent to the parties to a trade:

1. **The position notification** reports all derivative contracts registered in each clearing account (position), the margin requirements, if any, the market value of the position and certain other risk parameters. The position notification is sent to brokers and market makers on the morning of the first day after the trading day. The position notification of a broker gives details of his customers’
positions, which the broker is obliged to pass on to the customers concerned.

2 The trades and payments statement gives details of the derivatives contracts booked in each clearing account on the trading day (T), their prices and the payments and fees to be forwarded to the FOM together with their due dates. The trades and payments statement is submitted to brokers and market makers on the morning of the first day after the trading day. A broker or market maker may receive several trades and payments statements, each concerning a different product line.

3 The invoice gives details of the net sums which a broker or market maker is due to pay to or receive from the FOM. These amounts usually fall due on the third business day after the trading day (T+3) or on the fourth business day after the exercise day (E+4). An invoice is submitted to every broker and market maker on the first business day after the trading day.

4 The exercise notification gives details of the sums due to be paid or received, as well as any underlying instruments to be received or delivered, on the fourth business day (E+4) after the exercising or expiration of a derivative contract (exercise day E). The payments associated with the exercising of contracts are combined and netted with other items in the invoice.

All clearing documentation is forwarded to the parties on the morning of the first business day after the trading or exercise day (T+1, E+1). Payments normally fall due at 12 noon on the third or fourth business day after the trading or exercise day (T+3, E+4). The collateral mentioned in the position notification must be deposited by 11 am on the first business day after the trading day (T+1).

The payments related to the exercising of contracts are added to the other payments effected on the same day. All deliveries of underlying assets are effected by 12 noon from sellers to the FOM and from the FOM to buyers (Figure 3).
Figure 3. Clearing and settlement schedule at the Finnish Options Market

Trading day (T) or exercise day (E)

- The trade is booked in the clearing account. The FOM becomes a party to the trade. The system prints out a position notification, a trades and payments statement and an invoice (exercise notification, exercise calculation and net value settlement calculation).

First business day after trading or exercise day (T+1, E+1)

- The print-outs are submitted to brokers and market makers in the morning. Collateral is deposited by 11 am.

Third business day after trading day (T+3)

- Option premiums and the FOM's fees and commissions are paid by 12 noon.

Fourth business day after exercise day (E+4)

- Cash settlements and payments related to the delivery of underlying assets are effected.
4 Further development of clearing

4.1 Objectives for risk management

Since the risk management associated with clearing at the FOM is primarily based on margin requirements, it is essential that these are adequate. On the other hand, excessive margin requirements distort the structure of the derivatives markets, especially at times when there is a shortage of collateral. The aim is that margin requirements should reflect the actual risks attached to derivatives positions in the prevailing market situation in the most expedient and dynamic fashion possible. Consequently, the FOM regards it necessary to link known future payments to margin requirements. Since the clearing organization is responsible to all parties for the fulfilment of the rights and obligations associated with trades, the flow of payments from buyers to sellers through the FOM would make it possible to take into account premiums and exercise payments. The result would be a reduction in the margin requirement arising from the writing of an option before settlement of the premium. Similarly, the payments or receivables arising from exercising an option or a futures contract would raise or lower the margin requirement after the expiration date.

From the point of view of the risk management of the clearing organization, the system could also be modified to allow the effect of cash transactions to be taken into account in the real-time monitoring of brokers' positions. It would then be left to the discretion of the brokers to decide whether or not to require offsetting collateral from end-customers for this purpose.

Risk management is affected not only by the delay in cash transactions (at present T+3 or E+4), but also by the delay in depositing collateral (11 am on T+1). The FOM's real-time monitoring of positions, including the clearing accounts of brokers' customers, would allow such delays to be taken into account. In addition, a real-time obligation to deposit collateral could be implemented by linking the margin requirements imposed on brokers' customers during the trading day (before 11 am on T+1) to the monitoring of brokers' positions.

In addition to the real-time monitoring of account positions, the FOM has developed collateral simulation programs as a risk management tool for itself and for brokers and market makers. The programs can simulate instruments included or planned to be included in positions as well as changes in the market situation, in which case
real-time market information can be applied where needed. These tools can be used for effective monitoring of customer risks as well as organizations' internal risk management.

4.2 Other objectives for clearing and settlement

The settlement period for derivatives contracts will probably be shortened from four business days at present to three business days in line with the timetable being applied in the book-entry system for stock market transactions.

The settlement of stock derivatives contracts in the book-entry clearing and settlement system, i.e. deliveries of book-entry securities, is expanding as the underlying assets of stock options and futures are gradually being converted into book-entry securities.

Another objective is to develop a system that would enable the FOM's settlement reports to be printed out directly on the printers of the brokers, market makers and custodians. This would minimize the movement of paper print-outs between the options exchange and its counterparties and eliminate the delays this involves. It is already possible for brokers and market makers to receive daily most of the settlement print-outs electronically from the FOM’s information system after trading hours.

4.3 Objectives for payments

The FOM intends to shorten the payment delay caused by premiums on derivatives contracts from three business days to one business day. This is in accord with international recommendations. A reduction in the settlement time for premiums will probably require that payments connected with transactions in the derivatives markets are — in line with the settlement of money and stock market transactions — effected through a cheque account at the Bank of Finland and a terminal at the FOM.
4.4 Observance of international recommendations

The principle of "delivery against payment", which is one of the most important international recommendations on clearing, is already implemented at the FOM when delivery takes place against an irrevocable payment guaranteed by the FOM.

The "same day funds" convention is also implemented at the FOM by netting payments for each broker and market maker at 12 noon on every business day, whereupon funds can be transferred to end-customers.
# New Payment Systems and the Central Bank

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1 New developments in payment systems

Electronic payment systems developed for transferring interbank payments are becoming increasingly common in all the industrialized countries. They speed up payments transfer and improve the quality of payment transmission. Compared with traditional methods of transmitting payments, the new systems involve significant economies of scale and rationalization gains. It would hardly be possible to increase the volume and value of payments at the present pace without corresponding advances in payment technology. At the same time, the implementation of new payment systems is helping to enhance the planning and monitoring of bank liquidity. As the systems require large investments, they also call for cooperation between banks and participation by the central bank.

Payment systems can be divided into retail and large-value payment systems. Large-value payments are usually considered to include corporate customers’ payments, or wholesale payments, and interbank payments, which are effected by banks for their own account or on behalf of their customers. Retail payments, or bulk payments, are payments initiated by private customers and arising from credit transfers, cash withdrawals and the payment of bills of various kinds.

Examples of foreign large-value payment systems are the Federal Reserve’s Fedwire and the private Clearing House Interbank Payments System (CHIPS) in the USA, and the Swiss Interbank Clearing (SIC) in Switzerland. The Bank of Finland’s new Interbank Funds Transfer System (BOF-IBS), operational since spring 1991, and the Helsinki Money Market Center Ltd’s clearing and settlement system are Finnish examples of electronic large-value payment systems. 1

The new payment systems involve risks which the participants have attempted to control and reduce in different ways (Hasko, 1991). These risks include systemic risks, which, when realized, can through a domino effect endanger the operation of the entire payment system and even lead to the failure of completely innocent parties. In some cases, a central bank may incur a credit risk. Furthermore, the systems are exposed to functional and technical disturbances.

The central banks’ interest in electronic payment systems can be attributed not only to their desire to reduce the risks inherent in the systems but also to the close links these systems have with the

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1 See, for instance, the articles by Palva and Vehkamäki in this publication.
monetary policy implemented by a central bank. Banks’ current account balances at the central bank represent payment resources with which final payments are ultimately settled. It is by regulating the amount of these payment resources that the central bank can influence bank liquidity and consequently the determination of money market interest rates. The structures of payment systems are therefore closely linked with the central bank’s system for controlling liquidity and interest rates.

With the development of payment systems, increasing attention is also being paid in Finland to the links these systems have with central bank policy and to reducing risks. This has led to the imposition of restrictions, in the form of limits and collateral requirements, on the overdraft facilities provided to holders of current accounts with the central bank. The Bank of Finland’s system for controlling liquidity is being developed into a reserve system in which banks are required to hold free reserves at the central bank. In such a system, the overdraft limits on central bank accounts could be low, and the safeguarding of the liquidity of the payment system would, in the first place, be based on banks’ own reserves.

2 International examples of payment systems

It is useful to begin a discussion of payment systems by distinguishing between systems based on the gross settlement principle and those based on the net settlement principle (Vital and Mengle, 1988). In gross settlement systems, each interbank payment transaction is settled separately. Each payment transfer is accompanied by a simultaneous transfer of covering funds, i.e., central bank money. From the recipient bank’s point of view, a payment becomes final as soon as its current account at the central bank has been credited. The settlement is complete when also the remitting institution’s account has been debited. Problems may arise when the funds in the remitting institution’s account are insufficient to cover a payment; it incurs temporary debt to the central bank for the intervening period. In practice, the implementation of the principle of gross settlement requires that the central bank participate in the system.

In net settlement systems, transactions and funds transfers are effected separately. Funds are not transferred in connection with each payment; rather, when a receiving institution is notified of a payment,
this constitutes a claim on the remitting institution, and these claims are collected up to a certain point in time. On the basis of the gross payments that have accumulated during the day, the claims and liabilities are then netted and funds are transferred from the accounts of the net debtors to the accounts of the net creditors.

Gross settlement and net settlement systems differ from each other both as regards their efficiency and the risks inherent in them. A net settlement system may be operationally more efficient than a gross settlement system, in which each payment generates an interbank transaction. However, the practical significance of this difference in efficiency is disappearing with technological advances in electronic payment systems.

In net settlement systems, the delay between the transfer of a payment instruction and the settlement of a payment creates a danger of systemic risk. If a net sum cannot be transferred from one account at the central bank to another because the funds in a particular party's account are insufficient, all gross payments underlying the net sum will be cancelled. This may trigger a domino effect in the payment system, which means that some other participants might, in turn, be unable to settle their payment obligations on time because they have not received their incoming funds.

Perhaps best known electronic payment systems are Fedwire, which is operated by the Federal Reserve of the United States, and the Clearing House Interbank System (CHIPS), which is a private system (see Belton et al., 1987, and Mengle et al., 1987). Both systems have been operating in an electronic environment since the beginning of the 1970s, but over the years, their operations have expanded both as regards different types of payment and the number of participants.

All the institutions which hold reserve or clearing accounts at any of the member banks of the Fed may participate in Fedwire. The system is used by almost 7,000 banks (Belton et al., 1987) and it is based on the gross settlement principle. In addition to interbank funds transfer, the system is used for the transfer of book-entry US government securities.

CHIPS, on the other hand, is a net settlement system. In other words, payments are settled, netted and paid at the end of each business day using a separate account at the New York FED. Net positions arising during each day constitute de facto debt obligations, although their legal status is still somewhat unclear (Mengle et al., 1987, and Gilbert, 1989).

Swiss Interbank Clearing (SIC), which is a gross settlement system, was introduced in Switzerland in June 1987. In 1988, its members, which are required to hold giro accounts at the central bank
of Switzerland, already numbered 156 institutions. Both retail and large-volume interbank payments are transferred through SIC (Vital and Mengle, 1988).

Systems designed for interbank funds transfer are in use at least in the United Kingdom, Japan, France, Germany, Switzerland and Sweden. In addition, the largest commercial banks of the EC countries have created a fully automatic system for payments in private ECU. This system, which is operated by the Bank for International Settlements (BIS), is based on the net settlement principle.

The payment flows passing through the electronic systems are enormous. Some years ago Fedwire, for instance, had a turnover of about 200 000 interbank payments each day, with a total value of USD 500 billion. The average size of a payment was thus USD 2.5 million. In addition, book-entry securities transfers through Fedwire averaged 30 000 per day, the average size of a transfer being USD 8.7 million (totaling USD 260 billion per day). The average number of payments transmitted daily through CHIPS was about 114 000, with a total value of USD 425 billion. The average size of a payment was thus USD 3.7 million. Compared with the participating banks' reserves, the growth in payment flows through the systems has been explosive. In 1985, the volume of payments was more than 25 times larger than the volume of the banks' reserves (Mengle et al., 1987).

In 1988, the number of payments transmitted through SIC was 250 000 per day, totalling over CHF 100 billion per day. Thus the average size of a transaction was notably smaller than in the United States. At the end of 1988, the flow of transactions through SIC was approximately 30 times larger than the volume of the banks' reserves. In payment systems where customer payments between banks are also settled to a large extent, the number of payments can be significantly higher.

In Finland, about 1.3 million payments passed daily through the interbank clearing for customer payments in 1990. The total value of the payments was FIM 3.4 billion per day and the average size of a payment was about FIM 620. In the Bank of Finland's Interbank Funds Transfer System, which also includes the figures on the above-mentioned payment clearing in net terms, an average of 800 payments with a total value of FIM 25 billion are transmitted each day; the average size of a transaction is thus FIM 30 million.
3 Daylight overdrafts

In daily interbank transactions, daylight overdrafts may occur in banks’ current accounts at the central bank under gross settlement systems, because the banking system does not synchronize its daily payments. For instance, certain transactions in money market instruments are often negotiated in the morning, but the related payments are not effected until later in the afternoon. Between the repayment of earlier debts in the morning and the receipt of newly borrowed funds in the afternoon, there may be a few hours’ interval during which some banks’ balances held at the central bank are negative.

Because the daylight overdrafts of these banks are offset by the deposits of other banks, the intraday net debt of the entire banking system vis-à-vis the central bank is usually not as high as that of an individual bank. After all, it is the central bank which, through its own operations, ultimately determines the liquidity of the banking system on any particular day.

In the two payment systems operating in the USA, there are, on a typical day, an average of 1 100 banks which incur daylight overdrafts totalling between USD 80 and USD 100 billion in their interbank transactions. Another USD 60 billion of overdrafts result from book-entry securities transfers (Mengle et al., 1987, and Humphrey, 1989). Although the average overdraft of an individual institution is not very large (between USD 70 and USD 100 million), overdrafts may occasionally amount to a few billion dollars where large institutions are concerned.

Overdrafts may last from some minutes to several hours. In the case of large institutions, overdrafts last approximately four hours, but the duration of the largest overdrafts is usually not longer than 45 to 90 minutes (Mengle et al., 1987). Overnight overdrafts occur in systems where individual payment transactions and their net settlement in the central bank’s accounts are not carried out during the same day.

In the Bank of Finland’s Interbank Funds Transfer System, the banks occasionally incur notable daylight overdrafts. From the beginning of March 1991 to the end of August of the same year, the largest single daylight overdraft of any individual bank was more than FIM 5 billion, according to the Bank of Finland’s intraday credit monitoring system. On the basis of the Finnish banks’ own evaluation, their aggregate need for intraday credit limits is FIM 14 billion.
4 Risk reduction

The large amount of daylight overdrafts has given rise to concern about the risks involved in electronic payment systems. There are different types of such risks, including interbank credit risk, central bank's credit risk and systemic risk. Although these potential risks have never been realized, different policies have been initiated to reduce them.

In gross settlement systems operated by central banks, in which a payment is final for the recipient bank as soon as its account has been credited, the risk is transferred to the central bank if the funds in the remitting institution's account are insufficient or if the remitting institution has to resort to its possible overdraft facility in order to effect a payment. To the central bank, this risk is a credit risk which will be realized if the remitting institution turns out to be insolvent. No systemic risk arises in terms of a domino-effect, because the payment is final for the recipient, and its effects will therefore not be repeated.

In contrast, systemic risk may arise in net settlement systems, such as CHIPS, if one institution with a net debit position proved to be insolvent at the end-of-day netting, causing the claims of the other institutions to remain unpaid as well, in which case the negative effects would be multiplied (Gilbert, 1989). In principle, a systemic risk of this kind can be eliminated if the central bank guarantees the net amounts due to the recipients, but that implies that the risk is transferred to the central bank as a credit risk.

With the exception of the clearing of money market instruments, all net settlement systems in Finland are, in principle, subject to systemic risk. As it is unlikely that the risk would be allowed to be realized, it is transferred to the Bank of Finland as a credit risk. The credit facility mechanism implemented at the Helsinki Money Market Center shares the risk between the participants.

In the USA, attempts have been made to reduce the risks connected with daylight overdrafts by establishing limits (caps) on daylight exposures for each participant. In recent years, there has been a tendency to tighten these limits (Belton et al., 1987, and Gilbert, 1989). Furthermore, the Federal Reserve requires the banks to keep their overdrafts within certain limits that are applied to each institution's overall daylight exposure on all electronic systems (in practice, only in the two systems mentioned above). In addition to this, the banks participating in CHIPS have determined bilateral net credit limits for each other.
The size of a limit depends on the institution, and at its highest, a limit may be from 1.50 to 2.25 times the bank’s primary capital. On the basis of guidelines issued by the Federal Reserve, the banks may themselves propose the sizes of the limits they require. Of the almost 7,000 institutions, only 3,000 banks hold a limit. Others have either not considered it necessary, or the authorities have refused to assign limits to them (Belton et al., 1987).

The Federal Reserve monitors and supervises on an ex post basis the daylight overdrafts of banks, and interferes if the overdraft limits are exceeded. The Federal Reserve may, whenever necessary, impose real-time controls on the daylight overdrafts of troubled institutions. Such institutions may also be asked to post collateral for daylight overdrafts.

On the whole, the usage rate of the limits is not very high. Among large US institutions, this ‘cap usage rate’ has averaged 40 per cent. The cap usage rate of all banks has remained well below 20 per cent (Belton et al., 1987).

Switzerland’s interbank payment system, SIC, was from the start designed so that no daylight exposures could be incurred (Vital and Mengle, 1988). In other words, all participants have been assigned zero limits. SIC has a queuing facility, which means that the first payments in the queue are paid first, as soon as there are sufficient funds in the account. In addition to this, the system automatically ensures that a payment is not transferred to the recipient’s account before there are sufficient funds in the remitting institution’s account.

The system accepts orders 24 hours a day, but orders sent after the close of business are not processed until the following morning, when they are either dealt with in the order they have arrived, or transferred to a queue to await covering funds. The payments have been priced so that the recipient is always charged a small standard fee, whereas the remitting institutions are subject to a charge which is graduated so that early payment is less expensive.

There has for long been discussion in the United States on the need to further reduce daylight exposures. The options considered have ranged from the explicit pricing of debt to additional reserve requirements (Gilbert, 1989, and Van Hoose, 1991). Interest has also been shown in the Swiss model, although its direct application in the USA is considered difficult because of the large number of participants (Humphrey, 1989).

None of the solutions, proposed or currently in use, for reducing the risk involved in daylight overdrafts or for eliminating these overdrafts entirely, are watertight in the sense that they would remove the central bank’s role as the lender of last resort. For instance in
Switzerland, where no daylight overdrafts arise, preparations have been
made for direct intervention by the central bank to prevent 'gridlock' situa-
tions, ie situations where the transfer of all payments is interrupted because some of the participants have insufficient funds. On the other hand, the Swiss model is considered good for the very reason that when liquidity problems arise, the central bank has to consider immediately what kind of special arrangements it will make (Vital and Mengle, 1988).

5 Impact of payment systems on financial markets

The development of payment systems and the efforts to reduce the risks inherent in them affect, in one way or another, the behaviour of the banks and the financial markets in general.

In so far as the efforts to reduce risks lead to explicit or implicit increases in the pricing of daylight overdrafts, it is likely that the increased costs are partly transferred to other prices, such as securities trading margins. The banks' payment service practices may also change. The banks may, for instance, delay the sending of less time-critical payments. For a customer, this may mean higher prices for urgent payment orders.

In the interbank market, the effects of this development may be such that, in an effort to reduce their gross payments, the banks will tend to use roll-over or continuous contracts to even out fluctuations in their liquidity. In addition, netting by novation may become more general in money market transactions. Netting by novation means that gross obligations are bilaterally netted before the value date, so that only the resulting net amounts are payable (Mengle et al., 1987, and Humphrey, 1989).

One possible consequence is that the repayment of interbank overnight credits will be transferred from the morning to a later time, which may mark a step towards an open intraday credit market. In principle, the emergence of such a market would also influence other short-term interest rates and fluctuations in them, which again may be significant as far as central bank policy is concerned (see Van Hoose, 1991).

The development of intraday credit markets is at its most advanced in Japan, where efficient interbank morning and afternoon markets have emerged providing intraday credit between banks. This
is a natural development, because in several payment systems settlements take place at 1.00 pm in addition to opening and closing time. Interest has to be paid on credits raised in these morning and afternoon markets, which also reduces the credit risks inherent in the system.

Improving the efficiency of overnight money markets will become increasingly important, as central banks are likely to tighten the automatic overdraft facilities attached to their accounts, either in order to reduce their own credit risks or to render the banks less dependent on the central bank’s credit facilities.

6 Linkage of payment systems to central bank policy

The structures of payment systems are connected with the proximate targets of central bank policy and, above all, with liquidity and interest rate control systems. Funds held by banks in the central bank’s current account system — which for the sake of simplicity are hereafter referred to as the banks’ reserves — represent the resources or ’good funds’ that are ultimately used to settle final payments. The central bank may regulate the amount of banks’ reserves through money market operations and thus influence bank liquidity and money market interest rates.

In order to ensure the efficacy of monetary control, the terms applied to central bank credit generally stipulate that either no interest or only a very low rate of interest be paid on bank reserves held at the central bank. In contrast, the rate of interest which banks have to pay on reserves borrowed from the central bank is normally higher than market rates. These restrictions are aimed at preventing banks from using central bank credit for purposes other than the temporary smoothing of fluctuations in liquidity. Thus, the possibility of banks to borrow from the central bank does not nullify the latter’s attempts to affect the money supply through open market operations. At the same time, this system encourages banks to trade their surplus reserves with each other (banks’ overnight market).

In many countries banks are required to keep a certain minimum amount of reserves at the central bank. Originally, such reserve requirements were intended to ensure that banks had adequate liquidity, but they soon began to assume increasing importance as a means of regulating bank liquidity and interest rates. The reserve
requirements became a tool which could be used whenever necessary for tightening or easing monetary conditions. Despite this, the systems can permit some flexibility in meeting minimum requirements. For example, in the USA the requirements do not have to be met daily; rather, a complicated 'two-week rule' is applied.

The Finnish minimum reserve system has played a prominent role as an instrument of monetary policy owing to the fact that the deposits have not been liquid. In the last few years, however, the significance of reserve requirements as an instrument of monetary control has diminished owing to the development of the money market and the introduction of open market operations.

The general trend in the reserve systems of central banks has been to attempt to increase the banks' holdings of free reserves so as to reduce liquidity risk and dampen interest rate fluctuations. The means used to achieve this, in addition to paying interest on excess reserves, has been to limit access to borrowed reserves through quotas, administrative sanctions, penalty interest rates and collateral requirements. In a system of this kind, the safeguarding of the liquidity of the payment system would mainly be based on the banks' own reserves.

Attempts to reduce the central bank's risk arising from daylight overdrafts by pricing or other means may also easily affect fluctuations in short-term interest rates. For instance, the levying of administrative penalty interest on overdrafts may make movements in interest rates more rigid. This, in turn, may complicate the implementation of monetary policy, if the proximate operative target of monetary policy is regulation of liquidity (reserve targeting) (Van Hoose, 1991).

7 Finnish viewpoints

In Finland, the credits granted to banks for the purpose of safeguarding their liquidity are divided into intraday credit generated within the Bank of Finland's current account system and liquidity credit (formerly call money credit), which banks with access to these facilities may obtain from the Bank of Finland, if there are insufficient funds in their accounts at the end of the day. This credit facility ultimately ensures the liquidity of the banks that are entitled to liquidity credit. At present, the terms and conditions of liquidity credit are tied to market interest rates through the Bank of Finland's tender rate so that under no circumstances is it worthwhile using liquidity
credit for purposes other than dealing with unforeseen liquidity shortfalls.

In the new current account system, special attention has been paid to the risks accruing to the Bank of Finland from daylight overdrafts. Initially, the participating banks had unlimited intraday overdraft facilities without any collateral requirements. On 1 March 1993, however, overdraft limits and collateral requirements were introduced on a trial basis.

These requirements became permanent with effect from 1 December 1993. Banks which fulfil the criteria for access to central bank liquidity credit are required to deposit collateral equivalent to 25 per cent of their overdraft limits, whereas financial institutions which do not meet the criteria are required to put up collateral for the full amount of their limits.

Banks can provide collateral by giving the Bank of Finland the right to set off credit against their (non-liquid) minimum reserve deposits or in another form such as government securities or Bank of Finland certificates of deposit.

The banks play different roles as regards management of payment flows and participation in payment clearing arrangements. Accordingly, there might be grounds for also allowing banks to have different levels of access to the central bank's credit facilities. Tying the limits systematically to banks' equity capital, for instance, does not seem an expedient solution, because banks' need for intraday reserve credit is largely dependent on the nature of their activities. In this sense, allowing banks to influence the size of their limits brings flexibility to the system, and the limits then better reflect the needs for daylight overdraft that arise from banks' operations. However, the success of the system requires that some kind of explicit or implicit costs is attached to the limits, so that banks will not propose unnecessarily high limits "to be on the safe side". The collateral requirements introduced in 1993 are an effective way of avoiding unduly high limits.

The current account system is connected with the central bank policy systems primarily through the liquidity system, but in principle also through the minimum reserve system. In principle, the cost of liquidity credit can be made so expensive as to induce banks to eliminate their intraday credit by the end of the day. Failure to do so would mean that the remaining debt would be converted into expensive liquidity credit. At the same time as some banks with access to liquidity credit incur gross intraday debt to the Bank of Finland, the latter incurs intraday debt to the recipient banks. If this positive
balance on a current account is not used up during the day, it becomes a call money deposit, which earns a low rate of interest.

The minimum reserve system has also been important in the clearing and settlement of payments in the sense that the minimum reserve deposits have formally assumed the role of collateral for the central bank’s settlement accounts. Because of economic recession, minimum reserve deposits have been reduced, and consequently their role as collateral for settlement credit has diminished.

In the context of the development of the Bank of Finland’s minimum reserve system, greater flexibility in the composition of reserves, synchronization of the time periods used for calculating and meeting reserve requirements and the right to carry over excess reserves to the following period or to use them to cover a subsequent reserve shortfall would make required reserves part of the overall supply of bank liquidity and would thus reduce banks’ liquidity risk. The non-interest-bearing reserves required from the banks would at the same time serve as compensation to the Bank of Finland for the payment system services (account-holding rights and clearing) and last-resort financing facility it provides.
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Publications of the Bank of Finland

Series A (ISSN 0355-6034)

Nos. 1–35. Publications of the Bank of Finland Institute for Economic Research, collections of articles which appeared over the period 1942–1972 under the heading "Taloudellisia selvityksiä (Economic Studies)", in Finnish and Swedish (ISSN 0081-9476); in German 1942–1943


