
BANK OF FINLAND DISCUSSION PAPERS

2/96

Veikko Saarinen – Kirsti Tanila – Kimmo Virolainen

Financial Markets Department
7.2.1996

Payment and Settlement Systems in Finland 1995

Suomen Pankki
Bank of Finland
P.O.Box 160, SF-00101 HELSINKI, Finland
☎ + 358 0 1831

Veikko Saarinen – Kirsti Tanila – Kimmo Virolainen

Financial Markets Department
7.2.1996

Payment and Settlement Systems in Finland 1995

ISBN 951-686-493-7
ISSN 0785-3572

Suomen Pankin monistuskeskus
Helsinki 1996

Payment and Settlement Systems in Finland 1995

Bank of Finland Discussion papers 2/96

Veikko Saarinen – Kirsti Tanila – Kimmo Virolainen
Financial Markets Department

Abstract

This paper is an overview of domestic payment and settlement systems in Finland. It contains an up-to-date description of institutional aspects of payment systems, payment media used by non-banks, interbank exchange and settlement circuits and securities settlement systems. At the end of the paper, annual statistics are presented on payment and settlement systems and on payment media for the years 1989–1994.

Keyword: clearing, settlement, payment media, Finland

Tiivistelmä

Keskustelualoitteen tavoitteena on antaa yleiskuva Suomessa toimivista kotimaan maksujärjestelmistä ja arvopaperien selvitysjärjestelmistä. Se sisältää ajantasaisen kuvauksen maksujärjestelmien institutionaalisista puitteista, yleisön käytössä olevista maksuvälineistä, pankkien välisistä maksujärjestelmistä sekä arvopaperikauppojen toimitus- ja selvitysjärjestelmistä. Keskustelualoitteen lopussa on esitetty maksu- ja selvitysjärjestelmiä sekä maksuvälineitä koskevia tilastotietoja vuosilta 1989–1994.

Avainsanat: maksujärjestelmät, maksuvälineet, selvitysjärjestelmät, Suomi

Abbreviations used in the text

APC	=	Clearing system for physical shares
ATM	=	Automated teller machine
BOF	=	Bank of Finland Interbank Funds Transfer System
CB	=	Central Bank
CD	=	Certificate of deposit
DVP	=	Delivery versus payment
ECU	=	European Currency Unit
EDI	=	Electronic data interchange
EEA	=	European Economic Area
EFTA	=	European Free Trade Area
EFTPOS	=	Electronic Funds Transfer at the Point of Sale
EU	=	European Union
FIM	=	Finnish markka
FOEX	=	Finnish Options Exchange Ltd
GDP	=	Gross domestic product
HETI	=	Helsinki Stock Exchange Automated Trade and Information System
HMMC	=	Helsinki Money Market Center Ltd
KATI	=	Helsinki Stock Exchange Clearing and settlement system for bookentry shares
OTC	=	Over the counter
POLT	=	Banks' on-line ATM network
POPS	=	Data transmission and clearing system for express transfers and cheques
POS	=	Point of Sale
RTGS	=	Real-Time Gross Settlement
SOM	=	Finnish Options Market Ltd

Contents

	Page
Abstract	3
Abbreviations used in the text	4
1 Introduction	7
2 The institutional aspects	8
2.1 General legal aspects	8
2.2 Financial intermediaries that provide payment services	8
2.3 The role of the central bank	9
2.3.1 General responsibilities	9
2.3.2 Provision of processing and settlement facilities	10
2.3.3 Monetary policy and payment systems	11
2.3.4 Main projects and policies being implemented	12
2.4 The role of other private and public sector bodies	12
2.4.1 Ministry of Finance	12
2.4.2 Finnish Bankers' Association	13
2.4.3 Other co-operative bodies	13
3 Payment media used by non-banks	14
3.1 Cash	14
3.2 Non-cash payments	15
3.2.1 Credit Transfers	15
3.2.2 Cheques	16
3.2.3 Direct debit	17
3.2.4 Payment Cards	17
3.2.5 Postal instruments	21
3.2.6 Other payment instruments	21
3.3 Recent developments	21
3.3.1 Bank bar code	21
3.3.2 Home banking and telebanking	22
3.3.3 Bank statements as vouchers	22
3.3.4 Prepaid cards	22
4 Interbank exchange and settlement circuits	23
4.1 General overview	23
4.2 The Bank of Finland Real-Time Gross Settlement System (BOF system)	24
4.2.1 Functioning rules	24
4.2.2 Participation in the system	24
4.2.3 Types of transactions handled	25
4.2.4 Operation of the transfer system	26
4.2.5 Transaction-processing environment	26
4.2.6 Settlement procedures	26
4.2.7 Credit and liquidity risk	27

4.2.8	Pricing	28
4.2.9	Main projects and policies being implemented	28
4.3	Banks' Payment Clearing System	28
4.3.1	Functioning rules	29
4.3.2	Participation in the system	29
4.3.3	Types of transactions handled	29
4.3.4	Operation of the transfer system	30
4.3.5	Transaction-processing environment	30
4.3.6	Settlement procedures	30
4.3.7	Credit and liquidity risk	31
4.3.8	Pricing	31
4.3.9	Main projects and policies being implemented	32
4.4	Cross-Border Markka Payment Clearing ("Loro Clearing")	33
4.4.1	Functioning rules	33
4.4.2	Participation in the system	33
4.4.3	Types of transactions handled	33
4.4.4	Operation of the transfer system	33
4.4.5	Transaction-processing environment	34
4.4.6	Settlement procedures	34
4.4.7	Credit and liquidity risk	34
4.4.8	Pricing	34
4.4.9	Main projects and policies being implemented	34
4.5	Settlement of banks' postal giro accounts	35
5	Securities settlement systems	36
5.1	The institutional aspects	36
5.1.1	General legal aspects	36
5.1.2	The role of the central bank	36
5.1.3	The role of other public sector bodies	37
5.1.4	The role of private sector bodies	38
5.2	Summary information on securities markets	39
5.2.1	Main features of different securities markets	39
5.2.2	Basic quantitative aspects	40
5.2.3	Financial intermediaries operating in the different securities markets	41
5.2.4	Recent developments	41
5.3	Structure, operation and administration of securities settlement systems	41
5.3.1	The KATI settlement system for equity trades	41
5.3.2	The HMMC system for money and bond market trades	43
5.3.3	The SOM and FOEX settlement systems for derivatives trades	46
	References	49
	Appendix	51

1 Introduction

The banking system, bank accounts and funds transfers between accounts together constitute the basis of payment services in Finland. The use of advanced payment technology has made the system highly efficient by substantially reducing the need for manual work. This is reflected in a high level of automation in payments between banks and their clients (66 %) and especially in interbank payments (99 %).

The early introduction of postal (1939) and bank giro (1942) systems prevented the cheque from developing into an important payment medium and made credit transfers the main payment vehicle for small- and large-value payments. Debit cards are used fairly widely in retail payments. Prepaid cards were introduced in 1993 and electronic purses in 1994.

There is no common multilateral clearing centre in Finland; all third-party interbank payments made from one bank or banking group to another are cleared bilaterally and settled centrally in the central bank's RTGS system (BOF system).

The BOF system was introduced by the Bank of Finland in 1991 to handle real-time funds transfers between the central bank and the banks. The net payments of the two securities clearing systems are also settled in the BOF system.

2 The institutional aspects

2.1 General legal aspects

Exchange controls on payment and other capital flows between Finland and other countries were gradually dismantled in the 1980s. Only prudential requirements such as foreign exchange position limits for banks remain.

There is no unified legislation governing payment systems in Finland. However, there are a number of separate laws regulating various areas of the payment system. The Act on the Bank of Finland (1925) sets the central bank the overall objective of promoting the smooth operation of the payment system. A committee set up to propose amendments to the Act published its report in August 1994.

The Currency Act (1993) states that notes and coins are legal tender and that the Bank of Finland has the exclusive right to issue them.

Finland has a universal banking system and the Credit Institutions Act (1994) lays down a general legal framework for banking and financial activities. This law replaced the Deposit Bank Act (1991) and the Financial Activities Act (1992). The Act on the Activities of Foreign Credit and Financial Institutions Operating in Finland (1994) governs the activities of branches of foreign credit institutions. These and separate laws on the corporate structure of different types of banks were brought into harmony with the EEA agreement and the EU Second Banking Coordination Directive at the beginning of 1994.

The Cheque Act (1932), which is based on the Geneva Convention of 1931, sets out the rules governing the use of cheques. The laws dealing with bills of exchange, promissory notes and debt securities contain general provisions concerning payments in these areas.

There is no special legislation governing card payments, and the agreements between banks, customers and service providers in this area are based on contract law. However, the Consumer Protection Act includes provisions on lost, stolen and misused cards, and also lays down the responsibilities of card issuers and card holders. The Penal Code contains provisions on fraud involving payment media and money laundering.

2.2 Financial intermediaries that provide payment services

Bank accounts and funds transfers between them constitute the basis of the cashless payment system in Finland. Consequently deposit banks play a major role in the provision of payment services.

The new banking laws have put all deposit banks on an equal footing as regards prudential requirements and competition. Finnish deposit banks are divided into three categories according to their corporate structure: commercial banks, savings banks and co-operative banks. The state-owned commercial bank Postipankki

Ltd (Post Office Bank) handles all government payments, except large-value foreign-exchange payments, which are the responsibility of the central bank. The commercial banks' share of total bank deposits is around 65 %, both in terms of volume and value.

The postal system participates in the Finnish payment system in two ways. First, as an agent of Postipankki, post offices offer accounts, loans and payment services to their customers. Secondly, they offer postal money orders for making national and international payments in cash and provide cash delivery services to banks.

The banks own most of the credit card companies. The biggest of these, Luottokunta, is owned jointly by banks and central institutions of commerce and issues VISA cards. The central bank sold the shares of the company issuing prepaid cards and electronic purses to the banks in November 1995.

At the end of 1994 there were 13 commercial banks, 40 savings banks and 302 cooperative banks in Finland with a total of about 2,100 branches throughout the country. In addition, Postipankki provided payment and other banking services through some 960 post offices.

2.3 The role of the central bank

2.3.1 General responsibilities

Under the Constitution of Finland, the Bank of Finland "operates under the guarantee and care of Parliament and is supervised by the Parliamentary Supervisory Board". According to the Act on the Bank of Finland the objective of the Bank is "to maintain a stable and secure monetary system and to assist and facilitate the circulation of money in Finland".

The central bank puts notes and coins into circulation via the banking system. It distributes notes and coins to banks according to their needs and receives surplus or unfit currency returned by them.

In order to allocate more resources to the development of payment systems, the Bank of Finland established a separate payment systems unit in 1991. Its role is to co-ordinate payment systems activities and development work within the Bank, provide expertise on payment matters, carry out research on payment system issues, monitor developments in domestic and international payment systems and prepare changes and reforms that are deemed necessary.

The Bank of Finland may issue recommendations to banks on payment system matters but it is not legally empowered to issue any binding regulations. The only exception to this rule is the reserve requirement regulation, which was added to the Act on the Bank of Finland in 1993. As regards the issue of notes and coins the Bank has right to issue regulations under the Currency Act (1993). Participation by the Bank in the development of banks' payment systems is based on co-operation between the banks and the central bank.

The Bank is not yet legally empowered to oversee payment systems but this function is included in the duties of the Bank in the proposed Act on the Bank of Finland. The settlement operations of the Bank of Finland and the BOF system are audited by its Internal Audit Department and external auditors and monitored and supervised by its Financial Markets Department.

In October 1993 financial supervision was reorganized and transferred to the central bank. In that context the Banking Supervision Office, a government agency subordinate to the Ministry of Finance, was abolished and replaced by a new body called Financial Supervision Authority. Administratively, the Financial Supervision Authority is part of the Bank of Finland but it is independent in its decision making and has its own Board of Directors.

2.3.2 Provision of processing and settlement facilities

Provision of settlement accounts

The Bank of Finland offers authorized credit institutions a current account facility linked to a real-time gross settlement system for interbank payments (BOF system). The funds transfers on these accounts are related to the central bank's money market operations, daily interbank settlement arrangements and currency supply and maintenance operations. The BOF system is also used for settlement of banks' net clearing arrangements related to third-party payments as well as settlement of net balances in securities clearing by two clearing houses. To facilitate the settlement of their own and customers' payments the deposit banks maintain current accounts at the central bank. Besides banks, some other institutions¹ maintain current accounts at the Bank of Finland for the purpose of executing large-value funds transfers. Only funds transfers related to derivatives and some bond trades are currently not settled directly in the BOF system.

Provision of credit facilities

In order to promote the smooth operation of clearing and settlement, the Bank of Finland provides intra-day and fixed-term liquidity credit facilities to the deposit banks participating in the BOF-system.² A precondition for access to these facilities is that these institutions meet the conditions set by the Board of the Bank.

Intra-day credit is restricted to a certain maximum amount by setting an overdraft limit for each clearing bank and as from the beginning of 1996 by requiring each bank to deposit collateral for the full amount of the limit. To make the credit

¹ These are Finnish Export Credit Ltd, Helsinki Money Market Center Ltd, the Helsinki Stock Exchange Ltd, the State Treasury, the Government Guarantee Fund and Asset Management Company Arsenal Ltd which is owned by the state.

² The maturity of liquidity credit may be 1 day or 7, 14, 21 or 28 days. It is determined by the Bank of Finland. Since October 1992 the maturity has been 7 days. The credit must be fully collateralised.

limits and collateral requirements more binding the Bank has introduced penalties. The limits cannot be exceeded without the permission of the Bank. A flat fee is collected every time the account limit is temporarily raised during a day to unlock gridlock situations. A penalty rate is applied, if a bank cannot provide adequate collateral for its credit limit. Banks that repeatedly violate the rules can be put under special surveillance or in the event of serious offences they may be excluded from the system.

Liquidity credit may be granted by the Bank to domestic credit institutions and foreign credit institutions operating in Finland which are subject to minimum reserve requirements and have a current account at the Bank of Finland. Liquidity credit must be fully collateralised. The purpose of the central bank's liquidity credit facility is to safeguard a bank's liquidity in the event of an end-of-day debit balance in the bank's current account at the Bank of Finland after the daily clearing of payments.

As a rule, the Bank of Finland does not provide credit facilities for securities settlement systems. The Helsinki Money Market Center is an exception for which the central bank operates as the lender-of-last-resort for cash shortages by granting short-term credit against collateral.

Pricing policies

See section 4.2.8.

2.3.3 Monetary policy and payment systems

The Bank of Finland Interbank Funds Transfer System (BOF system) is part of the infrastructure needed for monetary policy implementation. Transfers of funds related to the central bank's monetary policy operations in the money and foreign exchange markets are executed in the system. The BOF system operated by the central bank itself guarantees that these very important payment transfers are irrevocable and settled quickly, safely and according to agreed time schedules. The Bank must be informed immediately of any disturbances.

To balance their books at the end of each business day banks have to make use of the interbank market and/or central bank liquidity facilities. Each day at about 3.45 p.m. after the gross settlement of interbank transactions and net settlement of different clearing systems, banks know their positions in their settlement accounts and their associated financing or investment needs. In the first place they seek to eliminate their liquidity surpluses or deficits by interbank lending or borrowing because it is more expensive to use central bank facilities than the interbank market.³ After interbank operations are settled the resulting net deficit or surplus of the banking sector is reflected in a change in bank reserves on current accounts at the

³ The rate of interest on liquidity credit is two percentage points above the Bank of Finland's tender rate and the rate on excess reserves on banks' current accounts is generally two percentage points below the Bank of Finland's tender rate. The Board makes a separate decision on the latter every time the tender rate is changed. These rates set the upper and lower level for short-term market rates.

central bank. By holding daily or weekly tenders the Bank of Finland can increase or decrease the banks' daily liquidity positions and exert downward or upward pressure on banks' reserve positions and thereby on short-term market rates.

In order to increase the amount of reserves available for making payments and to stabilise short-term interest rate developments the Bank of Finland decided, in June 1995, to modify its minimum reserve system. This was done by introducing averaging provisions from 1 October 1995 and by transferring banks' reserve holdings to their current accounts. This allows banks more flexibility in their liquidity management as they can even out intra-day variation in payments also by adjusting their non-interest-bearing minimum reserve holdings. Under the new system only the average level of reserves during the month must satisfy the reserve requirement for each period.

The introduction of averaging also entailed a significant change in the collateral practice applied to banks' central bank borrowing. Previously, minimum reserves were used as collateral for banks' intra-day overdraft limits and liquidity credits. With the transfer of minimum reserves to banks' current accounts, they are no longer available for use as collateral. Therefore banks now have to provide the Bank of Finland with other collateral, mainly Treasury bills and Bank of Finland CDs. The intra-day limits of banks at the Bank of Finland were also lowered because banks' liquidity increased on average by an amount equivalent to the minimum reserves.

2.3.4 Main projects and policies being implemented

On 1 October 1995 the reserve system was harmonised with other EU countries by introducing averaging provisions and minimum reserves were no longer accepted as collateral (see 2.3.3.).

From the beginning of 1996 the full collateral requirement for intra-day credits came into force for all participants in the BOF system.

2.4 The role of other private and public sector bodies

2.4.1 Ministry of Finance

The Ministry of Finance grants licences for the operation of credit institutions and other financial intermediaries and prepares legislation concerning banking and other financial activities. The ministry has a representative on the Board of Directors of the Financial Supervision Authority.

The State Treasury is responsible to the Ministry of Finance. It acts as the fiscal agent, co-ordinates the state's payments and acts as the state's cashier. For the settlement of large-value payments related to financial operations the Treasury holds an account in the Bank of Finland Interbank Funds Transfer System (BOF system).

The state's bulk payments are mainly effected through Postipankki, the state-owned commercial bank.

2.4.2 Finnish Bankers' Association

The Finnish Bankers' Association has functioned as the umbrella organisation co-ordinating the joint activities and representing the common interests of the Finnish banks since 1914. Its membership base has widened significantly since 1989–1990, when co-operation between all the various banking groups started under the auspices of the Association. It plays an important role as a general co-ordinator in the development by banks of payment services and banking technology for their joint use.

International developments have enhanced the role of the Finnish Bankers' Association as the representative body of Finnish banks. The Association joined the Banking Federation of the European Community as an associate member at the beginning of 1988.

The Finnish Bankers' Association provides information and statistics on the Finnish payment systems and participates in international co-operation through organisations such as the EDIFACT Board, Europay International S.A. and the European Committee for Banking Standards.

2.4.3 Other co-operative bodies

The Central Association of the Finnish Cooperative Banks coordinates the activities of the cooperative banks. It is also involved in developing marketing, information, research and training within the member banks.

The Finnish Savings Banks' Association is responsible for coordinating the joint banking policy of the savings banks and oversees their interests, research and planning, information and professional journals and bank security.

3 Payment media used by non-banks

3.1 Cash

As mentioned above, notes and coins are put into circulation by the Bank of Finland. The notes are printed by Setec Oy, the banknote and security printing house owned by the Bank. Coins are manufactured by the Mint of Finland Ltd, which is owned and supervised by the Ministry of Finance. The monetary unit is the markka, which is divided into one hundred penniä (singular penni).

Notes and coins are distributed to banks via the Bank of Finland's branch network and the postal system. At the end of 1994 there were four branches. Currency in circulation consists of notes in the denominations of 20, 50, 100, 500 and 1,000 markka, and coins in the denominations of 1, 5 and 10 markka and 10 and 50 penni. In 1993 the 10 markka note was replaced by a 10 markka coin and a new note in the denomination of 20 markka was issued. There is also a small stock of commemorative coins in denominations ranging from 5 to 1,000 markka. These are mostly collectors' items and are very seldom used as payment media. Notes and coins in circulation at the end of 1994 amounted to FIM 14,315 million and of this amount notes and coins held by banks totalled FIM 3,504 million and notes and coins held by the public FIM 10,810 million (Table 4).

Cash is the most commonly used payment medium in retail business. On the basis of a sample survey carried out by the Bank of Finland in autumn 1992, it is estimated that about 80 % of the total number of retail transactions are made in cash. But as these are relatively small payments, cash plays a minor role in the payment system as a whole, measured in value terms.

Precise data on the annual volume and value of cash transactions are not available. However, some estimates have been made. According to the above sample survey, use of cash by households corresponds to about 40 % of their consumption in value terms, implying that the total value of cash transactions was around FIM 90 billion in 1992.

The average ratio of notes and coins held by the public to the narrow monetary aggregate M1 has been around 7 % in recent years (Table 2). The respective ratio to GDP has been slightly over 2 %, which is very low by international standards.

Nowadays, more than 70 % of cash is withdrawn from cash dispensing ATMs, the number of which increased rapidly in the late 1980s. The machines have been in joint use since 1990. The number of cash dispensers has decreased, amounting to 2,271 at the end of 1994 (Table 6). The average amount withdrawn per transaction has been close to FIM 400 in recent years and the number of cards with a cash function 2.3 million (Table 7).

In 1994 the main banking groups founded a company, Automatia Pankkiautomaatit Oy, to administer cash dispensers in Finland.

3.2 Non-cash payments

Two giro-based non-cash payment systems were introduced in Finland more than 50 years ago: postal giro by the state-owned Postipankki and the post office system, and bank giro by the private deposit banks. The practice of paying wages and salaries directly into employees' bank accounts began in the 1960s, and was later extended to pensions and other social benefits. These features, together with extensive co-operation between banks, have resulted in compatible transfer systems in the banking sector and created a good basis for non-cash payments.

Today, Finnish banking customers hold just over 13 million accounts in transferable deposits, i.e. almost 3 per capita (Table 5). The amount of money deposited in these accounts at the end of 1994 was FIM 144 billion which corresponds to about 30 % of GDP (Tables 1 and 2). These accounts are of several different types: deposit accounts, savings accounts, postal giro accounts, transaction and cheque accounts. Some of them may have an overdraft facility. Customers can make various payments from these accounts and write cheques on cheque accounts. Corporate customers usually have bank accounts in more than one banking group.

3.2.1 Credit Transfers

Bank and postal giros are traditionally the dominant credit transfer systems in Finland. Until 1993 there were separate forms for bank giros and postal giros, although the two giro systems have long been in joint use. In 1993, however, these forms were unified by introducing a new common giro form. At the same time the term "giro" was used for both bank and postal giro. The giro payment operates as follows: a customer gives an order to debit his account and to credit the payee's account in the same or another banking group, or, especially in the past, only to credit the payee's account with a sum of cash, i.e. to pay the bill over the counter in cash. In order to reduce the amount of paper – and thus expenses – banks have developed electronic methods of transmitting orders (in-house and cashiers' terminals, ATMs etc.).

The giro system was originally paper-based and thus fairly expensive to operate, which gave banks a strong incentive to develop electronic systems. By applying a pricing policy which approaches full-cost pricing the banks have sought to persuade customers to make greater use of electronic transfer systems. In 1994 66 % of all payments instructions from customers were received electronically. Over 99 % of all interbank payment instructions are nowadays exchanged electronically. In 1994 the number of credit transfer orders from customers to banks totalled 434 million, of which 275 million was giros between banking groups (Tables 8 and 10).

In order to link the payment system to companies' billing systems the banks have developed the so-called reference number system. A "reference giro" is a giro with a pre-printed reference number that identifies the bill and the payer to the payee. The service enables creditor companies to receive data on incoming payments from

banks quickly and safely via their own payment control system (EDI) or as paper statements. Separate payment vouchers are not transferred in this system.

For urgent large-value giro payments there is a special service called "Express Transfer" by which funds can be transferred to the beneficiary on the same value date (for new developments in this area, see section 4.3.9.).

Recurrent payments

In Finland the transfer of recurrent payments was the first electronic payment service to be developed jointly by the banks in the 1960s. It enables corporate customers to transfer wages and salaries, pensions, payments for products and other recurrent 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. There were 93 million recurrent payment transactions in 1994.

A similar payment service is available to private customers. Previously, a customer would send bills to be paid in a special payment service envelope to his bank some days before they became due. The bank then debited the customer's account and credited the payee's account on the due day or on the day requested. Nowadays, a customer can authorise his bank on the basis of a single agreement to effect his recurrent payments, e.g. monthly rents or biannual insurance payments, from his account.

3.2.2 Cheques

Although the Cheque Act was passed as long ago as the 1930s, cheques have never been a very common payment medium in Finland. The use of cheques has decreased sharply in recent years in volume terms. Whereas 72.3 million cheques were written in 1984, only less than 6 million were written in 1994 (Table 10). The average value of cheques has risen from FIM 4,300 in 1985 to FIM 185,000 in 1994. Cheques are nowadays used mainly for large-value payments by companies and only to a very minor extent for retail payments by households. The main reasons for the decrease are the introduction of charges for cheques in 1988 and the increased use of debit cards. Nowadays most retailers refuse to accept cheques in their shops because of the manual work involved. Cheque truncation is used, thus reducing the manual work involved in handling cheques in banks to a minimum.

Bank drafts are cheques 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 transactions.

3.2.3 Direct debit

The direct debit is a pre-authorized transaction by which the payee, through his own bank, debits the payer's account on the due date. This method is mostly used for regular payments of varying amounts, such as electricity and telephone bills, newspapers and magazine subscriptions etc. The payee must inform the payer about the bill before sending the direct debit order so as to enable the payer to make sure there are sufficient funds in his account. The payer has no right to revoke a payment already debited.

The direct debit was introduced in 1978. It has gained strongly in popularity in the 1990s, with an average volume growth of around 30 % in recent years. The number of direct debit transactions totalled 17.9 million in 1994 (Table 10). It is a very convenient payment method for both the payer and the payee, and, since it is fully automated, the costs involved are relatively low for banks and users alike.

3.2.4 Payment Cards

Since the late 1980s, cards, especially debit cards, have been increasingly used in daily retail payments, partly replacing cash and almost completely replacing payments by cheque. The annual growth rate of cards in circulation has varied between 10 and 15 %. In the early 1990s, however, the rate of increase slowed down both in terms of numbers and value reflecting the slump in consumption, the economic recession in general and the tightening of risk management policies and issuance criteria for cards. Prepaid cards were introduced in 1993 and electronic purses in 1994.

The number of payment cards in circulation at the end of 1994 totalled 6,5 million (Table 7) and 229 million payments were executed by debit and credit cards with a total value of FIM 54 billion (Tables 12 and 13).

(a) Debit cards

Debit cards are issued by banks⁴ and the number of cards in circulation totalled 1,3 million in 1994. They are furnished with payment and ATM facilities; that is a customer can use a card to pay for purchases in shops, to pay bills via ATMs or simply as a cash card. In addition there are "combined cards", which also provide credit or delayed debit facilities.

Finnish bank cards are valid as payment media only in Finland. Under existing agreements between banking groups, it is possible to withdraw cash from some Scandinavian banks and from cash dispensers and ATMs in Spain.

In 1994 there were 30 bank card payments per inhabitant with a value of around FIM 6,900. The value of a single bank card payment was limited to FIM 200,000 in November 1995. The ratio of bank card payments to private domestic consumption was 11.9 % in 1990 and 12.6 % in 1994.

⁴ In Finland debit cards are called "bank cards".

Delayed debit cards

The most widely used delayed debit cards (excluding oil company cards), i.e. cards with a maximum of two months' delayed debit on which no interest is charged, are issued mostly by a bank-owned credit card company. Of these cards the VISA card is available for both domestic and international private personal use, Eurocard for domestic and international use by companies only and the "OK card" for domestic personal private use only. In 1994 there were just over 0,8 million such cards in circulation and the value of transactions amounted to some FIM 11 million.

No interest is charged on these cards; only an annual fee is debited, the size of which depends on the predetermined limit up to which the card can be used. There are altogether 21 different cards of this type, if cards issued by oil companies are included. Most cards used by companies belong to this group.

(b) Credit cards

There are 9 different credit cards in Finland, and most of them are issued by bank-owned finance companies. Payments by this type of card are usually larger in value than payments by other cards. In 1994 there were slightly less than 0,4 million credit cards in circulation and the average value of payments was about FIM 460 while for all other payment cards it was around FIM 200.

The average rate of interest on credit card credit has recently been around 18 % p.a. The total value of credit card payments in 1994 was FIM 3.7 billion, which was only slightly higher than in 1991.

(c) Retailer cards

This represents the largest group of credit cards in terms of numbers; there were 47 different cards and issuers in 1994 and 1,7 million cards in circulation (Table 7). Typically, they are issued by oil companies, travel agencies, furniture stores etc. The use of these cards has decreased slightly in recent years measured in terms of numbers of purchases. In 1994 the total value of retailer cards transactions was FIM 2.5 billion.

(d) Prepaid cards and electronic purse

Electronic purse

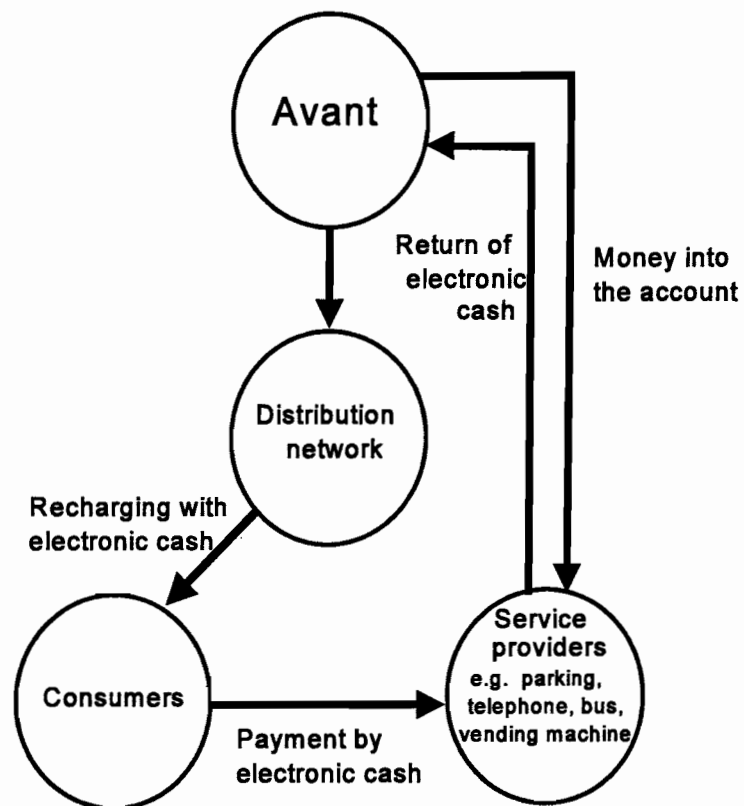
A company called Avant Finland Ltd, was established by the Bank of Finland in 1992 to develop a multi-purpose electronic purse system that would eventually replace cash in low-value payments. The central bank's aim was to promote the co-ordinated introduction of a nationwide electronic purse system open to any company selling services and products involving low-value payments. The Avant system was launched in 1993 with telephone cards containing a fixed amount of purchasing value, but these are gradually being replaced by the rechargeable electronic purse, which has been in production since mid-1994.

The use of the Avant purse system is anonymous, and the system does not require the clearing of individual transactions. Only the total balance must be

collected by each service provider accepting the Avant card. Among the areas covered by the existing range of service providers accepting payment via the Avant electronic purse are public payphones, parking, public transport, postal services and municipal services in some cities or regions.

Avant Finland Ltd transmits the electronic cash to be loaded in Avant cards via data transmission to security modules incorporated in recharging points. When the electronic purse is used for payment, the electronic “coins” stored in the memory chip of the Avant card pass from the card to the payment device. The electronic cash in the payment devices of service providers is collected either via telecommunication or by means of a collection card and transmitted to Avant Finland Ltd. Avant Finland then remits the corresponding sum to the service providers' bank accounts (Chart 1).

Chart 1. **The Avant Electronic Purse System**



In 1995, around 385,000 fixed-value cards issued by Avant Finland Ltd had been sold. Around 13,000 rechargeable Avant electronic purses had been taken into use by the end of 1995. There were 105 recharging points for recharging Avant cards, mainly in the biggest cities and 1 500 Avant points of payment.

Prepaid cards

In addition to the Avant electronic purse system, there are a number of other prepaid card systems in operation based on phonecards issued by Finnish Telecom and several regional telephone companies. These cards can only be used in public telephones.

The nationwide marketing company for private bus companies, Matkahuolto Ltd, is preparing to launch its own prepaid cards: an electronic seasonal ticket, an electronic serial ticket and a flexible stored-value card. Two cities are also planning to make use of the last-mentioned card for their public transportation and other municipal services. In addition, at least one city is planning to launch a local card of its own.

(e) **ATM and POS networks⁵**

Since 1989 bank customers have been able to execute credit transfers via ATMs which are owned by banks. At first, these machines and cash dispensers were installed separately. The first multipurpose ATMs incorporating cash dispensing and credit transfer facilities were installed in 1991–1992 and the number of these machines is gradually growing. ATMs with credit transfer facility have been in joint use since 1994, when the bank bar code system was introduced. In 1994 there were about 2 000 ATMs and a total of 39.6 million payments were effected through them, which was more than 15 % of all electronic transfers in the same year.

In Finland EFTPOS⁵ terminals are based on an off-line batch transmission system. The terminal identifies a card inserted into it on the basis of the data stored in the magnetic stripe. When the transaction is made, the terminal checks the validity of the card and that the card is one of the types accepted by the retailer. In addition, the terminal checks that the card is not on the list of cancelled cards ("hot card file"). However, the terminal does not check whether the customer has sufficient funds in his account or whether he is within a specified limit. The terminal may be linked to a retailer's cash desk system or it may store customers' card transactions independently in the memory of a computer. From there they are transmitted electronically at the end of the business day to banks and debited from customers' accounts.

In 1994 one credit card company introduced a 24-hour telephone authorization service for cards issued by it. This service is also available for debit cards. At the end of 1994 there were 48,000 EFTPOS card readers at 37,500 points of sale (Table 6).

⁵ See abbreviations on page 4.

3.2.5 Postal instruments

See section 2.2.

3.2.6 Other payment instruments

Taxi and bus vouchers are special payment media used for the payment of taxi and bus fares, primarily by employees or customers of business enterprises. They are used in the same way as cheques. The bank credits the beneficiary's account with the total value of vouchers honoured by it. The 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.

Luncheon vouchers are a payment medium used by employers, who buy the vouchers from the issuer and sell them to their employees at their taxation value or give them free of charge as a fringe benefit. Employees use vouchers to pay for meals in restaurants or cafés, which send the vouchers to the issuer. The issuer then credits their bank accounts with the respective sum of money. The highest value of a luncheon voucher is currently FIM 35 at the moment and its taxation value is FIM 22.

Gift vouchers are a payment medium issued by, for example, department stores and jewellery shops. They are sold in any denomination and can only be used for payment in the issuing shop or department store in the specified value.

3.3 Recent developments

3.3.1 Bank bar code

Banks began to implement a bank bar code system from late 1993 onwards in order to rationalise the giro system. The payee prints the bank bar code in advance on the giro form that is sent to the payer. The code contains all the billing and payment information necessary for the payee to recognise the payment (account number, reference number, due date and amount of payment, etc.). The coded data are read and payment is made by passing the giro's bar code through a code-reader installed in an ATM or a bank terminal. The system reduces manual work and mistakes, especially erroneously entered reference numbers, and thus speeds up the input process. The system was introduced on a wide scale in 1994 and the aim is that it should be in general use by the end of 1995.

3.3.2 Home banking and telebanking

Since the late 1980s it has been possible for private customers to use home terminals to make credit transfers from their own bank accounts to other account holders. The breakthrough in home banking occurred in 1990 and 1991 and it has rapidly gained popularity with the increasing use of personal computers at home. The connection is based on an agreement between a customer and a bank. The customer's data link to his bank is made over a telephone line using a modem and the bank provides the customer with the program for the data transfer.

Some banks offer their customers telebanking services, i.e. banking services by telephone. Having agreed on the use of the telephone service with his bank, a customer may, for example, arrange an automatic payment service, negotiate loans or matters relating to deposits, pay bills or ask for the account balance or details of the latest transactions by telephone. Information on "special offers" or new services provided by the bank is also available by telephone.

In 1994 there were 430,500 home banking connections and telebanking agreements, which is about ten times the number in 1990. Telebanking is still more popular than PC-based home banking.

3.3.3 Bank statements as vouchers

Pursuant to a ruling by the Finnish Accounting Board, the traditional delivery of separate vouchers to customers has been replaced by a service whereby the customer is sent a bank statement giving details of transactions in his account. Instead of a printed statement on paper a machine-readable form containing the relevant additional data may be used. To be acceptable as a voucher, a paper version (hard copy) of the electronic statement must be printed out, if the entity has not been authorised by the Accounting Board to keep records in machine-readable form.

All banks issue statements with a similar data content to their customers. Statements are issued on a daily, weekly or monthly basis if there have been transactions in the account. The use of this new service has reduced further the consumption of paper in the banking industry.

3.3.4 Prepaid cards

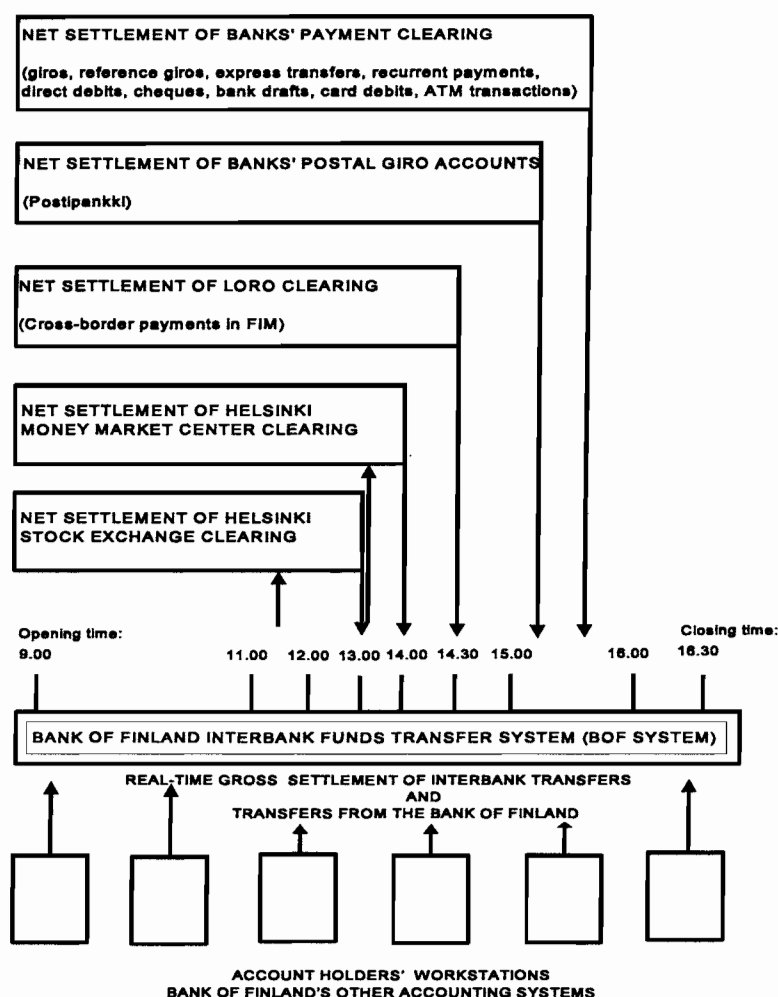
In November 1995 Avant Finland Ltd was sold to the joint electronic purse company Automatia Rahakortit Oy established by Finland's three largest banks. The goal of the deal is to establish one nationwide electronic purse system. The knowhow of Avant Finland Ltd will be combined with the branch and ATM networks as well as the customer base of the banks. It is estimated that the system meeting these goals will be built by the end of 1996.

4 Interbank exchange and settlement circuits

4.1 General overview

The Finnish interbank payment system consists of an RTGS system and several netting systems for customer payments (see Chart 2). The RTGS system was introduced in 1991 and it is used for funds transfers between the central bank and the banks. The three payment netting systems which use the central bank as their settlement agent are the Banks' Payment Clearing, Loro Clearing and Banks' Postal Giro Account Clearing. These are "mixed clearing systems" in the sense that they clear both large- and small-value payments between banks. Furthermore, the two securities clearing systems, Helsinki Money Market Center Clearing and Helsinki Stock Exchange Clearing, settle their net payments in the RTGS system.

Chart 2. **Different clearing systems linked to the Bank of Finland Interbank Funds Transfer System (BOF system)**



4.2 The Bank of Finland Real-Time Gross Settlement System (BOF system)

The Finnish RTGS system, the Bank of Finland Interbank Funds Transfer System (acronym BOF system), has been in operation since March 1991. It is owned, administered and supervised by the central bank. It is a decentralised system consisting of two subsystems: the Bank of Finland's current account application and the account holders' application. The two subsystems are linked by a telecommunications network. A multiuser option is to be added to the account holders' application in 1996.

Account holders in the BOF system have PC-based workstations which are connected to the BOF system on a real-time basis via a telecommunications network. The banks execute payments in real time by transferring funds from their own accounts to the accounts of other Bank of Finland account holders through their workstations.

In 1994 turnover on the BOF system amounted to FIM 6,360 billion and there were 105,000 transactions in all (Tables 8 and 9). Turnover was about 13 times Finland's GDP.

4.2.1 Functioning rules

The participants in the BOF system are governed by general rules set by the Board of the Bank and by the following agreements which form the basis for the system's operating rules:

- current account agreement;
- BOF system delivery agreement;
- BOF system user agreement;
- clearing agreement related to the settlement of the Banks' Payment Clearing.

Besides these rules and agreements the Bank sets the limits and collateral requirements for the intra-day and overnight central bank facilities of the participants, monitors the use of daylight credit and decides on special measures and surveillance in the event of violations (see 2.3.4.).

4.2.2 Participation in the system

The Bank of Finland grants banks and other institutions the right to become participants in the BOF system by according them access to its current account facility. Under the conditions effective since November 1994, the Bank of Finland can accord access on uniform terms to all domestic and foreign credit institutions

operating in Finland which are subject to minimum reserve requirements and meet the following requirements:

- the applicant must be subject to public supervision by the Financial Supervision Authority;
- it must meet the statutory requirements for minimum capital;
- its own funds must amount to at least FIM 30 million;
- the operations of the credit institution must be stable and managed according to sound and prudent business principles.

For special reasons and at its own discretion, the Bank may open current accounts for other institutions operating in the financial markets, such as clearing houses or securities brokerage firms. The opening of such an account must be deemed important from the point of view of the safety and efficiency of payment transactions, the conduct of monetary policy or the stability or efficiency of the financial markets.

A technical requirement for access to the BOF system is that the applicant acquires a workstation application. It is technically possible to operate such an application also from abroad, and so there is no technical obstacle to remote access.

In addition to the Bank of Finland itself there are currently 18 institutions authorized to participate in the system (Table 12). Most of these are domestic credit institutions or Finnish branches of foreign banks. There are also two institutions that can be classified as public authorities and four supervised non-credit institutions operating in the financial markets. At the moment no foreign credit institution participates in the funds transfer system directly from abroad (remote access).

The most important indirect participants are the savings (40) and the co-operative (302) banks. These are regional banks serving a local community or an entire economic region. Their central financial institutions, Skopbank for the savings banks and Okobank for the co-operative banks, have direct access to the BOF system and thus they operate as their member banks' settlement agents in the system⁶(see Chart 3).

4.2.3 Types of transactions handled

At present the BOFsystem is mainly used for the real-time gross settlement of interbank and central bank transfers only. These transfers are typically very important large-value payments which must be settled quickly and safely. The largest group of gross transactions consists of payments between banks related to money market and foreign exchange trading and interbank lending and borrowing. The second group comprises funds transfers between the Bank of Finland and the banks and are initiated mainly by open market operations and cash delivery to and from banks. The third group consists of third-party payments related to various netting systems (see Chart 2). At the moment no customer payments are settled on a gross basis. There are no restrictions on the minimum size of a funds transfer in the system.

⁶ From February 1996 onwards Aktia Bank will be the central institution and clearing bank of the savings banks as Skopbank will be converted into an asset management holding company.

4.2.4 Operation of the transfer system

The BOF system opens at 9.00 a.m. every banking day, after which entries can be made until the system closes at 4.30 p.m. However, account holders can monitor their account balances until 5.00 p.m.

The payment transfers are sent to the Bank using workstations located on the premises of the account holders. These are linked on-line with the Bank of Finland's current account database via telecommunication lines, which are leased from private telecommunication companies. To ensure the security of the data, all transfers are encrypted.

Once a payment is initiated by a sending institution with an account at the Bank of Finland, a BOF funds transfer is processed by the system and the funds are debited to the sending institution's account and simultaneously credited to the receiving institution's account, and information on the transfers is forwarded to the account holders concerned within seconds of the initiation.

The Bank of Finland's application, in which accounts and basic data on them are maintained, also serves as a subsystem for the Bank's accounting system and is connected in real time to the Bank's other accounting subsystems. Other subsystems are used for debiting and crediting current accounts in connection with transactions between account holders and the Bank. The major part of these payments are associated with the supply of notes and coin and with the Bank of Finland's foreign currency transactions with the banks.

Besides transferring payments in real time the account holders can use their workstations to monitor their liquidity position. All account entries of participants are transmitted back to their workstations in real time, thus permitting account holders to monitor entries and balances on their own account on a continuous basis. The system is able to print out various kinds of reports, the most important of which is the daily statement of account. The Bank sends updated common data and necessary notices to the account holders.

In the event of a disturbance or malfunction a back-up system is readily available and the settlement process can be completed for the rest of the day by using it.

4.2.5 Transaction-processing environment

See section 4.2.4.

4.2.6 Settlement procedures

The BOF funds transfer system is a real-time credit transfer system in which the sender of funds initiates the funds transfer.

Payment transfers entered by account holders and the Bank of Finland are settled and booked in the current account database of the Bank of Finland in real time. If there is insufficient cover on the account of the sender, the payment transfers

remain unsettled on his workstation. The system has no queueing facility and so unsettled transfers must be sent again when sufficient funds become available.

The RTGS system incorporates immediate finality. Payment transfers entered in the system are final as soon as they are settled. The completion of settlement means debiting of funds to the account of the sender and crediting of funds to the account of the receiver. Payments are not revocable after settlement. Mistakes have to be corrected by making a new transfer in the opposite direction.

At the moment there is no direct automated telecommunication link between the central bank RTGS system and the customer payment netting systems operated by the banks. Large-value customer payments can be settled individually in the RTGS system only if they are first entered manually in it via workstations.

Besides RTGS transfers central bank funds are also used for executing the settlement of different netting systems. These include the daily net payments by securities clearing houses and the net payments by the banks' netting systems according to the time-table below.

BOF system daily settlement schedule (local time)	
A. Real-time gross settlement	Time
1. Interbank transfers	All day (9.00 a.m. – 4.30 p.m.)
2. Central bank transfers	All day (9.00 a.m. – 4.30 p.m.)
B. Settlement for netting systems	
3. Stock Exchange Clearing	Time
- Incoming payments ¹	11.30 a.m.
- Outgoing payments ²	1.30 p.m.
4. Money Market Center Clearing	
- Incoming payments ³	1.00 p.m.
- Outgoing payments ⁴	2.00 p.m.
5. Cross-Border Markka Payment Clearing (Loro Clearing)	2.30 p.m.
6. Banks' Postal Giro Account Clearing	3.15 p.m.
7. Banks' Payment Clearing	3.45 p.m.

¹ The latest time for net payments by stockbrokers which, according to a final net calculation, have a payment obligation vis-a-vis the Stock Exchange.

² The latest time for net payments by the Stock Exchange to those stockbrokers which, according to a final net calculation, have a net claim on the Stock Exchange.

³ The latest time for net payments by clearing parties which have a payment obligation vis-a-vis the Helsinki Money Market Center (HMMC).

⁴ The latest time for net payments by the HMMC to those clearing parties which have a net claim on it.

4.2.7 Credit and liquidity risk

As funds transfers in an RTGS system are executed only if there is sufficient cover for each transfer, such a system does not involve any credit risk for the participants. The central bank incurs some risk because authorized banks are allowed to overdraw their settlement accounts during the day. To restrict the credit risk of intra-day borrowing the Bank of Finland has placed limits on the use of daylight credit. In

addition, all account holders entitled to daylight credit must provide 100 % collateral for their credit limit from the beginning of 1996. Likewise overnight and longer-term liquidity credits must be fully collateralised.

By introducing averaging provisions for minimum reserve deposits and by transferring these deposits to the banks' settlement accounts the Bank of Finland has increased the amount of short-term liquidity available for payment transfers and reduced the possibility of both liquidity and gridlock risk (see 2.3.3.).

4.2.8 Pricing

There is no separate entrance fee to the BOF system. But when a bank joins the system it has to pay the investment cost related to the necessary workstation and software. As users of the system the account holders pay the telecommunication charges, a flat monthly maintenance fee and a fixed fee per transaction. The fees are calculated according to the full-cost pricing principle.

4.2.9 Main projects and policies being implemented

Co-operation with the Finnish banks to develop domestic payment systems started in the spring of 1995 with a view to implementing the Minimum Common Features for Domestic Payment Systems as adopted by the EMI. A steering group and a co-operation group were set up to explore the required changes. The options of the enhancement of the netting systems to fulfil the Lamfalussy standards, the development of an RTGS system for third party large-value payments or some combination of the two are being studied in the groups.

4.3 Banks' Payment Clearing System

The Banks' Payment Clearing system is the most important netting system for customer payments in Finland. It is operated by the banks and covers both small- and large-value payments.⁷ It is mainly based on the concept of credit transfer but also includes debit transfers such as cheques. It is based on two subsystems, the postal giro and the bank giro system, which today are actually linked together as one giro system. In addition, the giro forms were standardised in 1994.

In 1994 the value of interbank payment transfers was FIM 1,865 billion and the volume of transactions was 374 million (Tables 8 and 9). The value was more

⁷ There are currently 8 clearing banks in Finland: Aktia Savings Bank Ltd, Interbank Ltd, Merita Bank Ltd, Okobank, Postipankki Ltd, Skandinaviska Enskilda Banken Helsinki Branch, Svenska Handelsbanken Helsinki Branch, Ålandsbanken Ab.

than four times Finland's GDP and the volume was about 54 % of total funds transfers (687 million) from customers to banks.

4.3.1 Functioning rules

The functioning rules of the system are governed by a number of agreements between the participants. These agreements determine the code of conduct as regards, for example, operating rules, operating hours, value dates, security issues, error correction and compensation etc. The relations between banks and their customers are not regulated by these agreements but there are general terms and conditions related to customers' domestic and cross-border retail payment orders.

The participating banks have a clearing agreement with the Bank of Finland under which the central bank undertakes to operate as settlement agent for the clearing banks.

4.3.2 Participation in the system

Access to the Banks' Payment Clearing system is open and can be granted to any authorized bank complying with the technical requirements of the system. An entrance fee is charged which covers part of the investment cost of the whole system. The participating banks own and operate the system and the Finnish Bankers' Association, which represents the banks collectively, decides on participation.

Participation in the system can be either direct or indirect. Direct participation is available to banks which have been granted clearing bank status. To obtain a clearing bank status a bank must apply for a current account at the Bank of Finland and thus fulfill the criteria for opening an account at the central bank (see 4.2.2.). Direct participants have to sign the agreements governing the system and pay a fee, which goes toward covering the initial investment costs of building the system and for subsequent changes caused by the entry of newcomers. A direct participant must be a deposit bank.

For banks not willing or able to participate directly in the system as a clearing bank there are two indirect means to do so; either via an existing clearing bank which provides clearing services as a clearing agent, or as a customer of an existing clearing bank. In both cases these indirect participants must be a licensed deposit bank in Finland.

4.3.3 Types of transactions handled

The clearing system handles both large- and small-value customer payments between banks. The banks' clearing calculations for each day cover payment instructions concerning credit transfers (giros), cheques, bank drafts, direct debits and debit card

transactions (including EFTPOS). Express transfers and ATM transactions are also included.

4.3.4 Operation of the transfer system

The customer interbank payment system is operated by banks and it is a bilateral netting system. It is exceptional in the sense that there is no common multilateral clearing centre for clearing of payments as is customary in most countries. All customer payments made from one bank or banking group to another are cleared bilaterally between banks and settled centrally in the BOF system at the central bank (see Chart 3).

The participating banks operate the system via their computer centres and through the telecommunication networks between them. Payments between customers who hold accounts in the same bank or banking group are executed in real time via in-house networks. The transmission of all third-party payment transactions in which the sender and the beneficiary have accounts in different banking groups is based on direct bilateral communication links between banks. Most of these payment transactions are processed centrally in each bank and sent to other banks in the form of batch transfers several times a day (Batch Transmission Network).

Payments originating in automated teller machines are transmitted via a separate on-line network (Banks' On Line Data Communication Network), known by the acronym POLT in Finland. A copy of this network will also be used in a new system for transferring express transfers and cheques from 1996 onwards.

4.3.5 Transaction-processing environment

The payment transactions are initiated both in paper and electronic form by customers and bank clerks. Electronic initiation is increasingly done outside the banks by personal and corporate customers using a PC or some other electronic means linked to the banks' systems. If paper forms are used they are transformed into electronic messages for transmission and the original messages on paper are filed in the sending bank. The payment transactions involving the same bank are transmitted to the accounting system of the bank for booking while payment orders to other banks are assembled in the sending banks' computer centres and sent two or three times a day as batches to the receiving banks.

4.3.6 Settlement procedures

Every day, each clearing bank calculates the net amount receivable or payable to each of the other banks in the system on the basis of all third-party payment transactions that it has forwarded to the other banks. These amounts are included in the clearing calculations which each bank transmits electronically via its workstation to the

central bank's BOF system. All clearing calculations are settled in a clearing run initiated by the central bank at 3.45 p.m. daily. If all banks with a net payment obligation have sufficient cover on their accounts, the amounts due are simultaneously debited and credited to the accounts of the participants at the Bank of Finland. (For the finality of payments, see 4.3.9.).

In the clearing agreement between the Bank of Finland and the banks a precondition for settlement is that each participant has sufficient funds to meet its payment obligations. There has never been an unwinding in the system because of lack of funds on the part of a participant.

4.3.7 Credit and liquidity risk

Each bank in the netting system receives the daily payment transactions as batches from other banks prior to settlement at the central bank at the end of day. If the receiving bank makes funds available to the customers before settlement is executed, as is the current practice, then it incurs credit risk in relation to the sending banks. So far, no counterparty limits or collateral arrangements exists between banks for managing the credit risk in the netting system.

The central bank facilities available for intra-day liquidity in net settlement are minimum reserves and intra-day credit. If a bank's liquidity need exceeds its intra-day limit, it can negotiate a temporary increase in its limit or borrow from other participants to avoid a gridlock situation in the settlement run. A penalty fee is collected by the central bank every time the limit is temporarily increased.

(For the risks of the central bank, see 4.3.6.)

4.3.8 Pricing

The pricing system between banks is based on reciprocity except that banks compensate each other for payments made through other banks' ATMs. This compensation is tied to the number of transactions.

A relatively new feature in the banks' pricing of customer payments are service packages. These were introduced as an alternative to separate transaction fees which are economical for personal customers only if the number of payments is low. Service packages are free of charge for retired and young people and for account holders with a minimum balance of FIM 10,000–15,000 on their accounts. For ordinary customers the self-service package is the cheapest option, e.g. FIM 10 per month and the individual over-the-counter service the most expensive, e.g. FIM 20 per month.

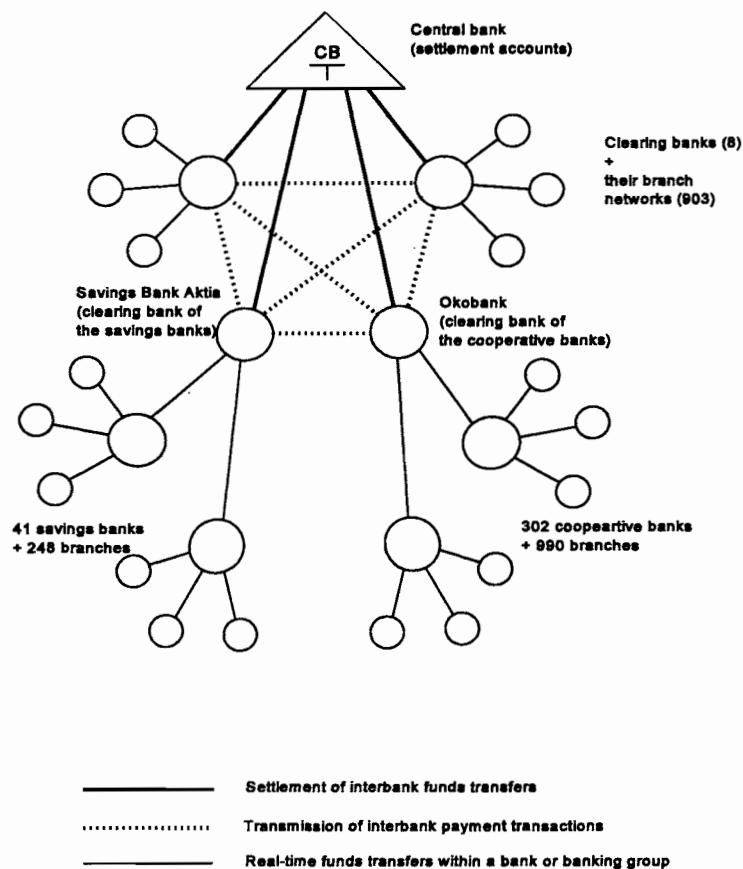
4.3.9 Main projects and policies being implemented

A new system for clearing large-value express transfers and cheques (called POPS in Finnish) is under development. When in operation it will enable banks to effect large-value payments between customers in real time more safely and more efficiently than is the case today. For the transmission of payment transactions the system will use a copy of the banks' on-line network (POLT). Payment transactions will be sent individually in real time to other banks but settlement will be executed as a net amount at the end of each day, except for payment transactions above a certain limit agreed bilaterally between banks which are settled directly transaction by transaction in the BOF system. The system should be in full operation from the beginning of 1996 (see also 4.2.9.).

In another project the banks are developing their bilateral messaging network, the Batch Transmission Network. The banks have agreed to acquire new transmission software and to start buying network services from Finnish Telecom. These changes should take place during spring 1996.

In the legal area a task force on legal matters was established by the banks in 1995 to explore the legal validity of netting, payment finality and the responsibilities of banks and their clients in the payment system. A report containing recommendations and proposals for necessary changes in law and regulations is expected during spring 1996.

Chart 3. **The Finnish interbank clearing system**



4.4 Cross-Border Markka Payment Clearing (“Loro Clearing”)

4.4.1 Functioning rules

The clearing system for cross-border Finnish markka payments, the so-called "Loro Clearing", is part of the domestic banks' correspondent payment system. It is used by domestic banks to clear cross-border markka-denominated payments when a "markka" payment originating from abroad is first sent to a domestic correspondent bank which is different from the beneficiary's bank, or when a "markka" payment going abroad is first forwarded from the payer's bank to the intermediary bank which is the Finnish correspondent bank of the foreign beneficiary.⁸

4.4.2 Participation in the system

All credit institutions that are connected to the SWIFT messaging system may participate in the system.

4.4.3 Types of transactions handled

Markka-denominated payments related to foreign trade, cross-border securities trade and cross-border clean payments are handled in the system.

4.4.4 Operation of the transfer system

Banks clear cross-border markka transactions bilaterally for the most part. The net amounts are settled daily in the BOF system. Two banks, Merita Bank and Postipankki, provide the loro clearing service by holding clearing accounts for other interested domestic banks and by acting as clearing agents for them.

⁸ A markka-denominated payment originating from abroad is considered a foreign payment in the domestic banking system until it is credited to the final beneficiary. Correspondingly, a markka-denominated payment sent to a foreigner is considered "a foreign payment" as soon as it is debited from the payer's account.

4.4.5 Transaction-processing environment

SWIFT is used as a message carrier in the transmission of loro payment messages in the domestic banking system.

4.4.6 Settlement procedures

Each day the agent bank transmits to the BOF system a loro clearing calculation containing the net positions of all participating banks. The net amounts are settled in the settlement run initiated in the BOF system at 2.30 p.m. local time (see Chart 2). (For the finality of payments, see 4.3.9.).

In addition to the original Loro Clearing system, daily bilateral net positions can nowadays be settled independently via real-time transfers in the BOF system. The Bank of Finland also participates in the system and holds markka accounts for some international organisations and central banks.

4.4.7 Credit and liquidity risk

See 4.3.7.

4.4.8 Pricing

The agent banks have their own tariffs for clearing services offered to other banks. As regards foreign payment services, banks have separate tariffs for personal and corporate customers.

4.4.9 Main projects and policies being implemented

The original Loro Clearing system was established in the 1970s to help in the monitoring and collecting of relevant data on markka-denominated capital movements. It enables domestic and cross-border markka-denominated payments to be cleared separately from each other in the domestic banking system and provides a checking mechanism for the coverage of balance-of-payments reporting.

However, in the context of the overall revision of the Finnish payment system, discussions with the banks are under way aimed at rationalising the procedures for cross-border markka clearing and settlement. The enhancement of risk management principles is also being explored (see 4.2.9.).

4.5 Settlement of banks' postal giro accounts

Most banks maintain postal giro accounts at Postipankki (the Post Office Bank) for payment transfer purposes. Outstanding balances in these accounts at the end of day are transferred to each bank's current account at the Bank of Finland or the deficit is covered by transferring funds to this account from the bank's current account at the central bank. In this way, the balances in the banks' postal giro accounts are brought back to zero at the end of each day.

Postipankki transmits a clearing calculation containing data on the necessary funds transfers via its workstation to the Bank of Finland. The settlement of these transfers between banks' settlement and postal giro accounts is executed in the BOF system at 3.15 p.m. daily (see Chart 2).

This arrangement has its origins in the once separate bank giro and postal giro systems. The two giro systems have been co-operating for two decades, but banks still have postal giro accounts, partly because of outdated legislation that still requires some government payments to be made using the "postal giro". The significance of this settlement circuit in terms of value transferred is minor nowadays.

5 Securities settlement systems

5.1 The institutional aspects

5.1.1 General legal aspects

There is currently no legislation governing securities settlement systems in Finland, with the exception of the derivatives market. So far, clearing and settlement of trades in instruments other than derivatives have been based on self-regulation. The activities of market participants are regulated by the Credit Institutions Act (1994), the Securities Brokerage Companies Act (1989) and provisions in the Securities Markets Act (1989). The Act on the Book-Entry Securities System (1991) and the Act on Book-Entry Accounts (1991) contain provisions on the operation of the book-entry securities system, which was introduced in May 1992. The Act on Trading in Standardised Options and Futures (1988) contains provisions on the clearing and settlement of derivative contracts traded on derivatives exchanges.

A proposal to include provisions on the clearing and settlement of securities trades in the Securities Markets Act is currently under consideration in the Ministry of Finance. Under these provisions, clearing and settlement would in the future be subject to authorisation and supervised by the relevant authorities.

5.1.2 The role of the central bank⁹

(a) General responsibilities

The Bank of Finland has no statutory responsibilities concerning securities settlement systems other than those related to the central bank's aim to maintain a stable and secure monetary system. The Bank of Finland is not legally empowered to issue any binding regulations concerning securities settlement systems.

(b) Provision of settlement facilities

The Bank of Finland does not provide securities accounts for market participants nor does it engage in securities lending to them.

(c) Provision of operational facilities

The Bank of Finland does not directly provide operational facilities for securities settlement but is involved as the largest shareholder in the activities of the Helsinki

⁹ See also section 2.3.

Money Market Center Ltd (HMMC). The HMMC is an electronic clearing house for money and bond market instruments in book-entry form.

(d) Monetary policy operations and securities settlement systems

Monetary policy operations on the money market are based on outright deals and repos in Treasury bills and certificates of deposit (CDs) issued by the Bank of Finland. Repo transactions may also involve benchmark bonds, other government-backed paper and CDs issued by banks entitled to central bank financing. Trading on this market is regulated by the money market rules and code of conduct, observance being supervised by the Bank of Finland.

To facilitate effective monetary policy operations, the Bank of Finland is a direct participant in the HMMC clearing and settlement system for money market trades in book-entry form. As the largest shareholder in the HMMC, the Bank of Finland exercises de facto oversight of the clearing and settlement of money market operations.

(e) Main projects and policies being implemented

The policies being implemented by the Bank of Finland with respect to securities settlement systems are guided by the aim of minimising systemic risks. Systems for the settlement of the central bank's monetary policy operations need to meet especially stringent criteria.

5.1.3 The role of other public sector bodies

(a) Financial Supervision Authority

Under current legislation the Financial Supervision Authority has few responsibilities with respect to securities settlement systems other than the supervision of licensed book-entry registrars, derivatives clearing houses and market participants. According to the proposed amendments to the Securities Markets Act, securities clearing houses would in the future be subject to supervision by the Financial Supervision Authority.

(b) Ministry of Finance

In its capacity as the body that prepares legislation concerning financial activities, the Ministry of Finance is currently considering a proposal to make clearing and settlement of securities trades subject to authorisation and supervision. According to the proposal, the Ministry of Finance would in the future be the body granting licenses for the operation of a securities settlement system.

For the purpose of issuance and clearing of government securities in book-entry form, the State Treasury, which is subordinate to the Ministry of Finance, is a direct participant in the HMMC clearing and settlement system.

(c) Securities Association

The Securities Association acts as the central organisation and coordinator of the Finnish book-entry securities system. It is responsible for the development of the system and for ensuring that the system functions in a reliable and proper way. The Association issues instructions and guidelines to participants in the system and is responsible for seeing that these are observed. The Central Share Register of Finland and all book-entry registrars are members of the Securities Association.

5.1.4 The role of private sector bodies

(a) Central Share Register of Finland

The Central Share Register of Finland Cooperative maintains 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. The members of the Central Share Register of Finland are organisations required to keep a shareholder register of book-entry securities that have been issued.

(b) Helsinki Money Market Center

The Helsinki Money Market Center Ltd (HMMC) offers market participants a safe-keeping system for debt securities in book-entry form. It also provides clearing and settlement services for these securities and takes care of redemptions and issues. The HMMC's largest shareholders are the Bank of Finland, the State Treasury and Finland's three biggest commercial banks.

(c) Helsinki Stock Exchange

The Helsinki Stock Exchange Ltd is the only operating stock exchange in Finland on which shares are traded. Up to 1984 the Helsinki Stock Exchange operated as an informal association. It was reorganised into a cooperative in 1984 and converted into a limited company in November 1995. The main function of the Helsinki Stock Exchange is to maintain an efficient and reliable secondary market for securities. It also provides centralised clearing and settlement services mainly for equity-based securities transactions.

(d) Derivatives Exchanges

Trading in standardised options and futures is carried out on two official derivatives exchanges in Finland, the Finnish Options Exchange Ltd (FOEX) and the Finnish Options Market Ltd (SOM). On both exchanges trading and clearing take place within the same organisation and are based on an electronic book-entry system.

(e) Other private sector bodies

The Finnish Bankers' Association and the Finnish Association of Securities Dealers function as umbrella organisations coordinating the joint activities of their members and representing their members' common interests. The Finnish Association of Securities Dealers, whose members include both banks, bank-owned securities brokers and independent securities brokers, also maintains the OTC and brokers' lists for trading in lesser known shares.

5.2 Summary information on securities markets

5.2.1 Main features of different securities markets

The Finnish securities markets consist of equity, money, bond and derivatives markets. Each of them has separate clearing and settlement arrangements. There are plans to merge the clearing and settlement arrangements for equity, money and bond market instruments by establishing a Central Securities Depository.

A paperless book-entry system was introduced in the securities markets in spring 1992. The Finnish book-entry securities system is decentralised in that book-entry registers may be kept by a number of organisations licensed for this purpose by the Ministry of Finance. However, the state, the Bank of Finland and the Central Share Register of Finland are not required to obtain a licence. In the share book-entry system, there are seven legally separate book-entry registers (August 1995). They are located partly in separate computer and communications environments. In the debt book-entry system, which is maintained by the Helsinki Money Market Center, legally separate book-entry registers (which numbered 12 in August 1995) exist in the same computer environment.

The bulk of equity trades in Finland is executed on the Helsinki Stock Exchange. Trades in lesser known shares can be executed on the over-the-counter (OTC) and brokers' lists. Equity trades can also be made outside these markets but they are then subject to stamp duty. Foreign investors are free to buy shares listed on the exchange using a broker as their agent. The clearing and settlement of book-entry equity trades are carried out in the KATI system of the Helsinki Stock Exchange. Trades made in physical shares are cleared in a separate system (APC) of the Helsinki Stock Exchange.

The money market is a wholesale market for short-term instruments issued by the banks, the State, local authorities and big companies. Most money market instruments were shifted to the book-entry system in spring 1992. The book-entry system is used for the registration, clearing and settlement of trades in CDs, Treasury bills and local authority paper which have been issued in book-entry form. Trades in physical instruments are cleared and settled bilaterally between counterparties.

The bond market is mainly a wholesale market for long-term paper issued by the government, the banking sector and business enterprises. Bonds are still based on physical instruments but they will be gradually integrated in the debt book-entry system and in the related electronic clearing and settlement arrangements from early

1996 onwards. A primary dealer system for benchmark government bonds was introduced in August 1992.

Trading in exchange-traded equity derivatives is concentrated on the Finnish Options Market (SOM), while the bulk of exchange-traded currency and (short-term) interest rate derivatives is traded on the Finnish Options Exchange (FOEX). Most of the trading in derivative instruments in Finland nevertheless takes place on the OTC market. Trading in markka-denominated bond forwards started in January 1994 following the signing by the Bank of Finland and the primary dealers in the benchmark government bond market of a market making agreement for bond forwards. OTC trades are normally cleared and settled bilaterally between counterparties. However, most of the trades in markka-denominated OTC bond forwards are currently cleared and settled centrally by SOM.

5.2.2 Basic quantitative aspects

At the end of 1994 the market capitalisation of listed companies amounted to FIM 181 billion (Table 15). In 1994 the total value of trades cleared and settled in the clearing centre of the Helsinki Stock Exchange was about FIM 143.6 billion and the volume of trades 339,264. The value of trades made in the electronic HETI (Helsinki Stock Exchange Automated Trade and Information) system totalled FIM 71.8 billion (Table 14). Overall, in 1994 some 91 % of the trades cleared were in shares in book-entry form; in December 1994 the proportion was already 97 %.

The money market continued to be dominated by CDs issued by the banks and the Bank of Finland. At the end of 1994 the outstanding amount of bank CDs was FIM 132.9 billion and that of the Bank of Finland CDs some FIM 35 billion. The outstanding amount of Treasury bills also stood in the region of FIM 30–35 billion at the end of 1994. In 1994 the value of trades cleared and settled in the Helsinki Money Market Center was FIM 1,934 billion and the number of trades 44,465 (Tables 13 and 14).

In 1994 bonds were traded on the Helsinki Stock Exchange to the value of FIM 2.2 billion. Trades outside the stock exchange on the OTC market amounted to FIM 523 billion.

In 1994 the total number of derivative contracts traded on the Finnish options exchanges was 1,082,071, and the value in terms of notional principal some FIM 115 billion (Tables 13 and 14). Options and futures on stock indices and shares accounted for the largest share of turnover. OTC trades in markka-denominated bond forwards were cleared and settled on SOM to the value of some FIM 60 billion in terms of notional principal amounts.

5.2.3 Financial intermediaries operating in the different securities markets

Trades on the Stock Exchange must be transacted through one of 21 authorised brokerage companies, of which seven are banks or bank-owned companies. Foreign-owned securities brokers operating in Finland may also be accepted as brokers. Eight of the trading members are partly or totally foreign-owned (August 1995).

The main participants in the money market are the Bank of Finland, the authorised money market banks and the State Treasury, which all have access to the BOF system. Other participants include the biggest savings and cooperative banks, other commercial banks, insurance companies and special credit institutions.

Banks and securities firms operate as dealers and brokers in the bond market. Foreign banks can also issue bonds and operate as dealers on the Finnish bond market upon receiving authorisation. There are nine primary dealers in the benchmark government bond market, of which seven are banks including two foreign banks that are not domiciled in Finland (August 1995).

Brokers and market makers on the options exchanges consist of securities brokers and banks. Altogether, there are 27 brokers and market makers on the options exchanges, of which nine are banks (August 1995). The first foreign broker commenced operations on SOM on a remote access basis in October 1995. The OTC derivatives market is dominated by banks (Table 16).

5.2.4 Recent developments

Efforts are currently being made to establish a Central Securities Depository of Finland which would combine the activities of separate book-entry registers and handle the safekeeping of all securities issued in book-entry form, and also the clearing and settlement of all trades in book-entry securities.

5.3 Structure, operation and administration of securities settlement systems

5.3.1 The KATI settlement system for equity trades

(a) Major regulation

Activities on the Helsinki Stock Exchange are regulated by the Securities Markets Act and the Rules of the Stock Exchange, as confirmed by the Ministry of Finance. In addition, activities of authorised securities brokers are regulated by the Securities Brokerage Companies Act.

(b) Participation in the system

In principle, all financial institutions which are subject to supervision by the Financial Supervision Authority may become clearing parties of the Stock Exchange. They must also meet certain requirements specified in the rules of the exchange, and be approved by the Supervisory Board of the exchange. Clearing parties total 25, of which 21 are also trading members of the Stock Exchange (August 1995). Other clearing parties include the Finnish Options Market and the custodians of foreign investors (Table 16).

(c) Types of transaction handled

The KATI settlement system handles book-entry equity trades made in the HETI (Helsinki Stock Exchange Automated Trade and Information) system. Off-exchange trades, deliveries of stock derivatives and stock lending agreements can also be sent to the KATI system for clearing and settlement.

(d) Operation of the transfer system

The KATI system is operated by the Helsinki Stock Exchange. Details of the trades approved for settlement and the book-entry trades are transferred from the Stock Exchange to the Central Share Register. Funds transfers related to the settlement of book-entry equity transactions are effected through the Bank of Finland Interbank Funds Transfer System (BOF system). The Stock Exchange has an account at the Bank of Finland and each clearing party must either have their own account or agree on their payments being handled by another party which has an account at the central bank.

(e) Transaction-processing environment

Trades made in the HETI system are transferred automatically to the KATI settlement system. Clearing parties are linked to the clearing centre of the Stock Exchange via a private telecommunication network.

(f) Settlement procedures

The KATI settlement system of the Stock Exchange operates according to the delivery versus payment (DVP) principle. In achieving DVP, the model 2 approach as defined in the Parkinson report¹⁰ is employed, i.e. the book-entry securities are delivered gross but payments associated with deliveries are netted on a multilateral basis. There is one processing cycle per settlement day from 11.30 a.m. to 1.30 p.m. From 1 January 1996 the settlement period is three days (T + 3). At the joint request of the counterparties, a trade can be transferred outside the system for bilateral gross settlement between the parties.

¹⁰ "Delivery versus Payment in Securities Settlement Systems", BIS 1992.

(g) DVP arrangements

At 10.00 a.m. on the settlement day, the clearing parties who have a payment obligation place collateral for their payments with the Stock Exchange on the basis of a preliminary net calculation so that DVP can be ascertained. At 11.00 a.m. the Stock Exchange makes a final net calculation for each clearing party on the basis of cleared transactions. A clearing party which, according to this calculation, has a payment obligation is obliged to effect the payment by 11.30 a.m. from his own account to the account of the Stock Exchange in the Bank of Finland Interbank Funds Transfer System (BOF system).

By 12.00 noon on the settlement day, the Stock Exchange provides the book-entry registers with information via the Central Share Register on those trades which were confirmed for settlement. The Central Share Register requests all registers at the same time to finalise securities transfer registrations. Technically, this is achieved by the Central Share Register transmitting to the registers an electronic impulse which initiates a delivery registration run. After this the registrars inform the Stock Exchange and the clearing parties by 1.00 p.m. that the relevant entries have been completed. The Stock Exchange is obliged by 1.30 p.m. to settle through the BOF system the sums due to clearing parties with a net credit position.

(h) Pricing policies

The Helsinki Stock Exchange applies full-cost pricing to all services offered to market participants.

(i) Credit and liquidity risk control measures

Achievement of DVP eliminates principal risk. The use of the BOF system for funds transfers minimises liquidity problems on the part of the settlement bank.

(j) Main projects and policies being implemented

The main project in which the Helsinki Stock Exchange is currently involved is the clearing and settlement of convertible bonds and bonds with warrants in the KATI system.

5.3.2 The HMMC system for money and bond market trades

(a) Major regulation

The activities and conduct of market participants in the money and bond markets were initially based on self-regulation. More formal regulation was introduced in April 1991 when the Bank of Finland and the banks operating in the market signed an agreement on A Code of Conduct for Money Market Dealings. The agreement is a general agreement which can be extended to cover any money market instrument. In 1992 the Bank of Finland and the organisations operating as primary dealers in the

government bond market signed an agreement which sets out the code of conduct for market makers in the secondary market and specifies technical details related to the trading in this market. Clearing and settlement of transactions in book-entry debt securities are carried out in the HMMC system on the basis of agreements and under clearing and settlement rules mutually agreed on by the participants.

(b) Participation in the system

Organisations using the HMMC system can either be members or other users. Acting as a direct participant (clearing party) does not require HMMC membership. Direct participants in the HMMC system include the Bank of Finland, the State Treasury, authorised money market banks, insurance companies and special credit institutions. There are 16 direct participants in the HMMC settlement system, of which ten are banks (August 1995).

(c) Types of transaction handled

The HMMC system handles issues of book-entry securities and book-entry securities transfers between the accounts of the system. The instruments currently handled in the system include CDs issued by the banks and the Bank of Finland, Treasury bills and local authority paper. From early 1996 onwards, government bonds will be gradually transferred to the HMMC book-entry system.

(d) Operation of the transfer system

The book-entry securities transfer system is operated by the HMMC. Funds transfers are executed through the Bank of Finland Interbank Funds Transfer System (BOF system). Trades are entered for settlement into the HMMC system by the parties to a trade via their workstations or through their trading systems.

(e) Transaction-processing environment

Safekeeping of book-entry debt securities as well as clearing and settlement of transactions in them all take place within the HMMC information system. For funds transfers a ledger for each clearing party is maintained in the HMMC current account at the central bank. Clearing parties are linked to the HMMC via direct lines.

(f) Settlement procedures

The HMMC system offers a number of settlement procedures. Trades can be settled in guaranteed net settlement, in continuous real-time trade-for-trade settlement, or as internal trades within a book-entry register. The delivery versus payment principle is strictly adhered to in the first two settlement procedures, which involve payments between different clearing parties. Guaranteed net settlement employs the model 3 approach (net funds and net securities settlement) while trade-for-trade settlement employs the model 1 approach (gross funds and gross securities settlement) as defined in the Parkinson report for achieving DVP.

If a trade is settled as an internal trade in the registrar's own subregister, it is 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. Normally, money market trades are settled two days after the trade date (T+2) and bond trades three days after the trade date (T+3). The HMMC also accepts trades with same day settlement (T+0) or with settlement on the following day (T+1), or for any future day.

(g) DVP arrangements

In guaranteed net settlement, the HMMC confirms a trade immediately the system has checked that the terms entered by both parties are identical. For trades made at least one day prior to their settlement date, the system verifies that the seller holds the instruments or will receive them in time. All 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. At the close of the day preceding settlement, the system executes a clearing run, in which net obligations are calculated. Clearing is based on multilateral netting between parties, and the HMMC guarantees delivery and payment in respect of cleared trades. The system requires the parties with a net payment obligation to post collateral. The HMMC accepts as collateral the underlying book-entry securities of the trading parties, other pledged book-entry securities and deposited funds. Trades failing to pass clearing may be transferred to trade-for-trade settlement until all the necessary clearing conditions have been met.

Each clearing party in the HMMC system who is liable to pay (has a net payment obligation for the day) transfers the relevant sum to the HMMC's current account in the BOF system not later than 1.00 p.m. At the same time, after verifying the inflow of payments, the HMMC delivers the book-entry securities from the selling parties' commission accounts to the buying parties' commission accounts and transfers the funds to those clearing parties who have a net claim for the day in question.

In rolling real-time trade-for-trade settlement, payments and deliveries are executed gross immediately the conditions for the completion of the trade exist. This means that the buyer has sufficient funds in his account for the settlement of the trade and the seller has a sufficient number of securities in his account for the delivery, or receives them in time from a chain of trades which are all settled at the same point in time. The DVP principle is observed and a failed trade must wait until all conditions are met.

(h) Pricing policies

The services of the HMMC are primarily used by its members. Membership can be obtained by buying HMMC shares or by paying an annual membership fee. Shareholders and annual members have full rights to use the system. Any other organisation wishing to act as a clearing party has to pay a fee for the on-line link and other services required.

(i) Credit and liquidity risk control measures

Achievement of DVP eliminates principal risk. Furthermore, the HMMC guarantees the execution of trades entered in net settlement from the moment of clearing on the day prior to delivery. This guarantee is based on collateral pledged to the HMMC by the clearing parties. If one of parties is unable to meet its net payment obligation, the HMMC takes care of the payment on behalf of this party. The HMMC's ability to pay is, in turn, ensured by the Bank of Finland, which can lend funds against adequate collateral to the HMMC as a last resort. Any final losses by the HMMC are distributed between the shareholders in proportion to their holdings. The use of the BOF system for funds transfers minimises liquidity problems on the part of the settlement bank.

(j) Main projects and policies being implemented

The HMMC plans to provide repo and securities lending facilities by the end of 1995.

5.3.3 The SOM and FOEX settlement systems for derivatives trades

(a) Major regulation

The Act on Trading in Standardised Options and Futures (1988) regulates the operations of an exchange serving as a trading and clearing organisation for derivative instruments. The activities of an options exchange are subject to authorisation, which is granted by the Ministry of Finance. The activities of an options exchange are also governed by its own rules, which must be approved by the Ministry of Finance. Furthermore, the activities of brokers and market makers are regulated by the Securities Brokerage Companies Act and provisions laid down in the Securities Markets Act.

(b) Participation in the system

In principle, all securities brokers licensed by the Ministry of Finance are permitted to act as intermediaries on an options exchange. They must also meet certain requirements specified in the rules of the exchange, and be approved by the Supervisory Board of the exchange. There are 27 clearing parties in the Finnish Options Market (SOM) and 17 clearing parties in the Finnish Options Exchange (FOEX)(August 1995).

(c) Types of transaction handled

FOEX handles options and futures on interest rates and currencies. SOM handles mainly options and futures on stock indices and equities, and also on interest rates and currencies. In addition, SOM provides a centralised clearing and settlement facility for markka-denominated OTC bond forwards and a securities lending facility.

(d) Operation of the transfer system

Derivatives are neither physical securities nor book-entry securities as defined in Finnish legislation on book-entry securities systems. The rights and obligations pertaining to derivatives are based solely on clearing account entries made in the systems operated by the exchanges.

Funds transfers as well as the safekeeping of collateral are arranged in cooperation with custodian banks. The exchanges themselves also act as custodians for the holding of collateral. Deliveries of the underlying securities are effected through the relevant securities settlement systems.

(e) Transaction-processing environment

Trades are mostly executed in electronic trading systems and to some extent by telephone. Clearing and settlement take place centrally in the information systems of the exchanges.

(f) Settlement procedures

The options exchange, in its clearing house role, acts as the central counterparty to all trades. Funds transfers between the exchange and the clearing parties are settled on the basis of multilateral netting. On each payment day by 12.00 noon (on SOM), or by 1.00 p.m. (on FOEX), clearing parties either receive a payment from the exchange or effect a payment to it. Payments are effected by funds transfers between current accounts of counterparties in different banks.

The settlement of payments and the delivery of underlying securities or the equivalent cash transaction are effected according to the practices of the underlying cash market. Option premiums and fees and charges for trades are paid to the exchange on either the third day (T+3 on SOM) or the second day (T+2 on FOEX) after the trade date.

(g) DVP arrangements

Deliveries related to equity derivatives traded on SOM are settled through the KATI system of the Helsinki Stock Exchange and thus satisfy the same criteria as spot equity trades settled through this system. In the case of other derivatives, the delivery of the underlying security is normally replaced by a cash transaction based on the net liability or claim position.

(h) Pricing policies

Both options exchanges are limited liability companies and their pricing policies are determined by competition and market demand.

(i) Credit and liquidity risk control measures

Since the options exchanges act as central counterparties to all trades credit risks are concentrated in them. The management of risks 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.

The reliability of the clearing house is guaranteed in the first place by the collateral, or margin, required from the clearing account holders. The options exchanges determine the collateral requirement for each clearing account daily using their own risk management models. The collateral must be deposited in the custodian bank at 11.00 a.m. on the next business day. For some derivatives transactions collateral is required in advance.

As the clearing parties are responsible for both their own and their customers' transactions, the financial soundness of the clearing parties ultimately ensures the reliability of the settlement system. The activities of the clearing parties on an options exchange are regulated by the exchange and are subject to supervision by the authorities.

(j) Main projects and policies being implemented

SOM has plans to effect payments related to derivatives trades through its current account in the BOF system in the future. In 1995 two foreign companies commenced operations as clearing parties on SOM on a remote access basis. It is expected that the number of foreign clearing parties will increase in the future.

References

In English:

BIS (1992) **Delivery versus Payment in Securities Settlement Systems.**

Kokkola, T. (1992) **An International Bibliography of Payment Instruments and Systems Literature for Years 1985–1991**, Bank of Finland, Discussion Papers 14/92, Helsinki.

Lempinen, U. and Lilja, R. (1988) **Payment Systems and the Central Bank**, Bank of Finland, D:70, Helsinki.

Payment Systems and Banking Technology in Finland 1989–1993 (1994), The Finnish Bankers' Association.

Payment and Settlement Systems in Finland (1993) A Collection of Papers. Bank of Finland, A:88, Helsinki.

Pylkkönen, Pertti (1994) **Derivatives Markets in Finland.** Bank of Finland Bulletin 4/94, Helsinki.

The Finnish Banking System (1994) 12th revised edition, The Finnish Bankers' Association. Helsinki.

The Finnish Book-Entry System (1992) Securities Association, Helsinki.

Viren, Matti (1993) **Large Banknotes Dominate Currency Demand.** Bank of Finland Bulletin 3/93, Helsinki.

Viren, Matti (1994) **Demand for Different Payment Media in Finland.** Bank of Finland Bulletin 2/94, Helsinki.

Marvala, Jyri – Marianne, Palva (1995) **The Bank of Finland Real-Time Gross Settlement System.** Bank of Finland Bulletin No. 5/95, Helsinki.

In Finnish:

Ahlqvist, Pia (1994) **Käteisrahan kysyntä Suomessa 1992.** Suomen Pankin keskustelualoitteita 6/94, Helsinki.

Hasko, Harri (1993) **Valuuttakauppojen netotus ja riskien hallinta.** Suomen Pankin keskustelualoitteita 6/93, Helsinki.

Kontkanen, Erkki (toim.) (1991) **Pankkitoiminnan käsikirja.** Kirjayhtymä, Helsinki.

Maksujärjestelmät ja pankkien jakeluverkot 1989–1993 (1994) Suomen Pankkiyhdistys, Helsinki.

Malkamäki, Markku (1991) **Keskuspankin rooli kansainvälistyvissä maksujärjestelmissä.** Suomen Pankin keskustelualoitteita 20/91, Helsinki.

Saarinen, Veikko (1993) **Maksujärjestelmät Suomessa.** Markka & talous nro 4/93, Helsinki.

Suomen maksu- ja selvitysjärjestelmät (1992) Kokoomateos. Suomen Pankki, A:84, Helsinki.

Viren, Matti (1993) **Maksuvälineiden käyttö ja käteisrahan kysyntä Suomessa.** Suomen Pankki, A:87, Helsinki.

Tom Kokkola - Ralf Pauli (1994) **Korttiraha.** Markka & talous 4/94, Helsinki.

Marianne Palva - Jyri Marviala (1995) **Suomen Pankin sekkitilijärjestelmä - nykytilanne ja tulevaisuuden haasteita.** Suomen Pankin keskustelualoitteita 31/95, Helsinki.

Appendix. Finland*

Table 1. **Basic statistical data**

	1989	1990	1991	1992	1993	1994
Population ¹ (000s)	4 973	4 999	5 029	5 055	5 080	5 098
Gross domestic product (billions of FIM)	487,0	515,4	490,9	476,8	482,4	507,8
Exchange rate vis-à-vis ECU ² 2)	4,7367	4,8570	5,0058	5,8014	6,6942	6,1906

¹ Year-end.

² Average for the year.

Table 2. **Settlement media used by non-banks**
(year-end, in billions of Finnish markkaa)

	1989	1990	1991	1992	1993	1994
Notes and coins	8,8	9,0	8,8	9,4	10,4	10,8
Transferable deposits ¹	115,5	132,5	121,9	125,4	131,4	143,6
Narrow money supply (M1)	124,3	141,5	136,6	134,6	141,8	154,4
Transferable deposits in foreign currencies	7,4	6,8	13,2	14,7	14,8	12,8

¹ In local currency.

Table 3. **Settlement media used by deposit-taking institutions**
(in billions of Finnish markkaa)

	1989	1990	1991	1992	1993	1994
Required reserves held at central bank ¹	23,6	22,8	13,6	10,3	9,9	6,5
Free reserves held at central bank ¹	0,7	2,7	1,1	2,9	1,4	1,1
Deposits at other institutions ²	12,2	10,8	6,3	6,6	5,3	5,5

¹ Average of end of month figures.

² Average of end of quarter figures.

* Sources of data:

The Bank of Finland, Helsinki Stock Exchange, The Finnish Bankers' Association, Statistics Finland, The Finnish Options Exchange, The Finnish Options Market, The Helsinki Money Market Center.

Table 4. **Banknotes and coins by denomination**
(Total value in millions of FIM, year-end)

	1989	1990	1991	1992	1993	1994
Total banknotes issued	12 073	13 399	13 306	13 209	13 442	12 382
Denomination of banknotes						
1 000 markkaa	3 016	3 474	3 241	3 376	4 053	3 829
500 markkaa	2 701	2 785	2 601	2 547	2 593	2 287
100 markkaa	4 893	5 600	5 951	5 807	5 490	5 196
50 markkaa	900	951	939	867	721	647
20 markkaa	-	-	-	-	284	364
10 markkaa	534	561	575	583	273	58
5 markkaa	21	21	21	21	21	-
1 markkaa	7	8	8	8	8	-
Coins issued	905	980	1 026	1 042	1 296	1 284
Denomination of coins						
10 markkaa	-	-	-	-	208	326
5 markkaa	324	353	374	385	434	416
1 markkaa	354	374	387	385	387	371
50 penniä	83	102	113	118	114	85
20 penniä	72	71	46	36	31	-
10 penniä	36	46	77	91	96	86
5 penniä	27	27	22	21	19	-
1 penniä	8	8	8	8	8	-
Notes and coins held by credit institutions	4 357	5 559	5 753	5 104	4 600	3 504
Notes and coins in circulation outside credit institutions	8 772	8 996	8 775	9 404	10 394	10 810
Memorandum items:						
Commemorative coins ¹	152	176	197	257	255	262
Notes and coins which ceased to be legal tender on 1 January 1994 ¹						387

¹ The item is included in "Notes and coins in circulation" in the balance sheet of the Bank of Finland.

Table 5. **Institutional framework end of 1994**

Categories	Number of institutions	Number of branches	Number of accounts (thousands)	Value of accounts (bill. FIM)
Central bank	1	4	0.021 ²	1,4
Commercial banks	11	907	8 582	84,3
Savings banks	40	248	585	8,4
Cooperative banks	302	990	3 737	48,1
Post Office ¹		957		
TOTAL	354	3106	12 904	142,2
Branches of foreign banks	3			
of which EC based	1			

¹ Post offices are also used as branches of Postipankki, which is a commercial bank.

² Number of current accounts used for payment settlements.

Table 6. **Cash dispensers, ATMs and EFTPOS terminals (year-end)**

	1989	1990	1991	1992	1993	1994
Cash dispensers						
Number of networks	2	1	1	1	1	1
Number of machines ¹	2 634	2 838	2 888	2 814	2 724	2 271
Volume of transactions (millions)	101,9	118,0	148,9	168,1	179,0	191,9
Value of transactions (billions) ²	36,0	46,2	58,6	64,9	68,7	72,9
ATMs						
Number of networks	3	3	3	3	2	1
Number of machines	85	505	718	984	1 477	1 984
Volume of transactions (millions)	0,0	2,2	8,3	14,3	23,0	39,6
Value of transactions (billions)
EFTPOS						
Number of networks ³	-	-	-	-	-	-
Number of points of sale (card readers)	16500	26500	33500	39000	42000	48000
Volume of transactions (millions)	80,0	122,2	161,0	173,8	173,3	195,2
Value of transactions (billions)	16,2	27,1	34,2	37,9	39,0	44,9

¹ Figures for years 1991-1993 are estimated. 1994 includes an exact figure.

² Reliable data is not available.

³ Off-line system.

Table 7. **Number of payment cards in circulation¹**
(in thousands, year-end)

	1989	1990	1991	1992	1993	1994
Cards with cash function	1 427	1 689	1 880	1 944	2 112	2 269
Cards with debit/credit function	2 621	2 758	2 583	2 542	2 515	2 516
<i>of which:</i>						
<i>debit cards</i>	1 362	1 386	1 355	1 303	1 288	1 319
<i>delayed debit cards</i>	294	206	234	214	222	187
<i>combination cards¹</i>	443	646	598	638	613	637
<i>credit cards</i>	522	520	456	387	392	373
Cards with cheque guarantee function	12	12	11	9	9	7
Multipurpose prepaid cards	-	-	-	-	-	7
Retailer cards	1 651	1 600	1 562	1 642	1 707	1 726
TOTAL	5 711	5 999	6 036	6 137	6 343	6 525

¹ Cards with debit card and delayed debit card function.

Table 8. **Payment instructions handled by selected interbank funds transfer systems: volume of transactions**
(in thousands)

	1989	1990	1991	1992	1993	1994
Banks' payment clearing	241 956	266 476	336 899	352 889	356 800	373 982
<i>of which</i>						
<i>giro transfers</i>	129 954	158 302	223 640	240 885	249 475	275 034
<i>debit cards</i>	91 508	96 021	104 416	105 555	102 011	94 733
<i>cheques</i>	19 341	11 331	8 194	6 138	5 124	4 159
<i>bank bills</i>	1 153	822	649	311	190	56
BOF system ¹	333	299	139	152	115	105
<i>of which</i>						
<i>credit transfers between banks</i>	.	.	72	81	66	63
<i>credit transfers between the Bank of Finland and the banks</i>	.	.	68	71	49	42

¹ Bank of Finland Interbank Funds Transfer System. The current system for collecting statistical data was introduced in March 1991, and so the figures for years before 1991 are not comparable with those after that.

Table 9. **Payment instructions handled by selected interbank funds transfer systems: value of transactions**
(in billions of Finnish markkaa)

	1989	1990	1991	1992	1993	1994
Banks' payment clearing	920,0	818,6	1 436,7	1 559,9	1 672,2	1 865,4
<i>of which</i>						
<i>giro transfers</i>	200,9	143,0	642,6	744,1	667,0	845,5
<i>debit cards</i>	18,3	20,8	23,5	23,8	22,2	22,1
<i>cheques</i>	634,3	614,1	735,4	775,2	972,7	993,5
<i>bank bills</i>	66,5	40,7	35,2	16,8	10,3	4,3
BOF system ¹	7 278,0	7 677,0	5 365,8	6 349,8	6 653,8	6 356,8
<i>of which</i>						
<i>credit transfers between banks</i>	.	.	4 753,2	5 466,0	5 941,7	5 880,6
<i>credit transfers between the Bank of Finland and the banks</i>	.	.	612,6	883,8	712,1	476,2

¹ Bank of Finland Interbank Funds Transfer System. The current system for collecting statistical data was introduced in March 1991, and so the figures for years before 1991 are not comparable with those after that.

Table 10. **Indicators of use of various cashless payment instruments: volume of transactions (third-party payments)**
(instruments, in millions)

	1989	1990	1991	1992	1993	1994
Cheques issued	23,3	13,9	9,9	7,4	6,7	5,7
Payments by debit and credit cards	178,0	196,3	212,4	218,1	211,5	229,4
Paper-based credit transfers ¹	207,4	210,0	206,7	198,5	182,7	172,0
Paperless credit transfers ¹	140,9	132,2	162,5	186,9	220,0	261,6
Direct debits	4,6	4,1	8,1	10,3	14,8	17,9
Total	554,2	556,5	599,6	621,2	635,7	686,6
Cross-border payments	n.a.	n.a.	n.a.	1,8	1,8	1,6
of which payments to EU-countries	n.a.	n.a.	n.a.	0,7	0,9	0,7

¹ From customer to bank

Table 11. **Indicators of use of various cashless payment instruments: value of transactions (third-party payments)**
(instruments, in billions of Finnish markkaa)

	1989	1990	1991	1992	1993	1994
Cheques issued	696,0	702,0	820,0	847,0	1080,0	1058,0
Payments by debit and credit cards	37,4	47,4	49,1	50,3	49,6	53,9
Paper-based credit transfers ^{1,2}	3728,0	3388,0	3149,0	2985,0	2956,0	2599,0
Paperless credit transfers ^{1,2}	2400,0	2633,0	3382,0	3857,0	4625,0	5110,0
Direct debits ²	9,0	8,0	15,0	20,0	28,0	34,0
Total	6870,4	6778,4	7415,1	7759,3	8738,6	8854,9
Cross-border payments	n.a.	n.a.	n.a.	168,6	672,0	289,7
of which payments to EC-countries	n.a.	n.a.	n.a.	87,6	126,7	163,9

¹ From customer to bank.

² Figures are partly estimated.

Table 12. **Participants in the BOF system and the Bank of Finland liquidity credit system**
(end of 1995)

Account holders (total 18)	Access to current account facility	Access to intraday credit facility	Access to liquidity credit facility
Credit institutions (12):			
Domestic credit institutions (8)			
Aktia Savings Bank Ltd	X	X	X
Finnish Export Credit Ltd	X		
Interbank Ltd	X	X	X
Merita Bank Ltd	X	X	X
Okobank	X	X	X
Postipankki Ltd	X	X	X
Skopbank	X	X	X
Ålandsbanken Ab (Bank of Åland Ltd)	X	X	X
Other EU credit institutions (4):			
Banque Indosuez, Helsinki Branch	X	X	X
Citibank International plc, Finland Branch	X	X	X
Skandinaviska Enskilda Banken, Helsinki Branch	X	X	X
Svenska Handelsbanken, Helsinki Branch	X	X	X
Non-credit institutions (6):			
Supervised financial institutions (4):			
Asset Management Company Arsenal Ltd	X		
Helsinki Money Market Center Ltd	X		
Helsinki Stock Exchange Ltd	X		
Finnish Options Market Ltd	X		
Public authorities (2):			
Government Guarantee Fund	X		
State Treasury	X	X	
Bank of Finland (CB)			
System owner and administrator			

X = facility granted.

Table 13. Transfer instructions handled by securities settlement systems: number of transactions

Securities Settlement System	1989	1990	1991	1992	1993	1994
Helsinki Money Market Center (HMMC)¹						
government securities	-	-	-	208	5 387	7 479
Cds	-	-	-	14 161	37 681	36 986
Helsinki Stock Exchange²						
shares	-	-	42 300	91 200	240 214	339 264
Finnish Options Market (SOM)						
futures	69 817	43 152	61 588	38 441	76 838	358 160
options	931 054	746 533	635 909	397 919	414 867	676 473
Finnish Options Exchange (FOEX)						
futures	18 448	3 420	6 976	6 041	3 374	22 357
options	152 326	41 455	6 149	6 277	6 209	25 081

¹ The electronic clearing and settlement system was launched in April 1992.

² Includes transactions both in paper-based (APC) and book-entry (KATI) securities. The APC system was launched in 1991 and the KATI system in 1992.

Table 14. Transfer instructions handled by securities settlement systems: value of transactions (mill. FIM)

Securities Settlement System	1989	1990	1991	1992	1993	1994
Helsinki Money Market Center (HMMC)¹						
government securities	-	-	-	11 607	230 844	333 286
Cds	-	-	-	425 098	1 172 469	1 600 505
Helsinki Stock Exchange²						
shares	-	-	6 600	11 269	49 077	71 782
Finnish Options Market (SOM)						
futures	3 567	1 568	1 027	774	1 735	63 659
options	53 658	53 524	20 036	9 812	14 327	27 854
Finnish Options Exchange (FOEX)						
futures	18 191	43 542	756 667	1 052	2 993	11 164
options				1 094	2 107	12 636

¹ The electronic clearing and settlement system was launched in April 1992.

² Does not include off-exchange trades settled in the system.

Table 15. **Nominal value registered by the system at the end of December**
(mill FIM)

Securities Settlement System	1989	1990	1991	1992	1993	1994
Helsinki Money Market Center (HMMC)¹						
government securities	-	-	-	4 945	24 328	34 288
Cds	-	-	-	60 723	106 950	129 221
Helsinki Stock Exchange						
shares ²	124 900	82 831	58 982	63 999	136 293	181 559
Finnish Options Market (SOM)						
futures and options ³	332	139	103	578	1 173	2 420
Finnish Options Exchange (FOEX)						
futures and options ³	122	6	8	12	620	1 116

¹ The electronic clearing and settlement system was launched in April 1992.

² Market value of listed shares. In the new book-entry system that has been gradually introduced from 1992 onwards, safekeeping of the securities is done outside the KATI system.

³ Open interest.

Table 16. **Participants in securities settlement systems**
(end of 1994)

Securities Settlement System	Settling securities	Holding securities accounts on behalf of customers	Settling cash directly in CB accounts
Helsinki Money Market Center (HMMC)			
banks	10	10	10
stockbrokers	0	0	0
securities houses	0	0	0
insurance companies	1	1	0
foreign central banks	0	0	0
Cedel / Euroclear	0	0	0
others	5	5	4
Helsinki Stock Exchange (KATI)			
banks	4	4	4
stockbrokers	16	16	3
securities houses	0	0	0
insurance companies	0	0	0
foreign central banks	0	0	0
Cedel / Euroclear	0	0	0
others	4	4	0
Finnish Options Market (SOM)			
banks	9	9	0
stockbrokers	18	18	0
securities houses	0	0	0
insurance companies	0	0	0
foreign central banks	0	0	0
Cedel / Euroclear	0	0	0
others	0	0	0
Finnish Options Exchange (FOEX)			
banks	6	6	0
stockbrokers	10	10	0
securities houses	0	0	0
insurance companies	0	0	0
foreign central banks	0	0	0
Cedel / Euroclear	0	0	0
others	0	0	0

BANK OF FINLAND DISCUSSION PAPERS

ISSN 0785-3572

- 1/96 **Kari T. Sipilä A Data Communication Network for Administrative Purposes within the EU.** 1996. 53 p. ISBN 951-686-492-9. (TK)
- 2/96 **Veikko Saarinen – Kirsti Tanila – Kimmo Virolainen Payment and Settlement Systems in Finland 1995.** 1996. 60 p. ISBN 951-686-493-7. (RM)