

**Payment systems in
the United Kingdom**

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List of abbreviations

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| AIM | Alternative Investment Market |
| APACS | Association for Payment Clearing Services |
| BBA | British Bankers' Association |
| BCSB | Banking Code Standards Board |
| BSA | Building Societies Association |
| CDI | CREST Depository Interest |
| CDL | CREST Depository Limited |
| CGO | Central Gilts Office |
| CHAPS | Clearing House Automated Payment System |
| CMO | Central Moneymarkets Office |
| CSD | central securities depository |
| EuroCCP | European Central Counterparty |
| FOS | Financial Ombudsman Service |
| FMIRs | Financial Markets and Insolvency (Settlement Finality) Regulations |
| FSA | Financial Services Authority |
| FSMA | Financial Services and Markets Act |
| IBDE | Interbank Data Exchange |
| IPE | International Petroleum Exchange |
| ISD | Investment Services Directive |
| ISMA | International Securities Market Association |
| LCH | London Clearing House |
| LIFFE | London International Financial Futures Exchange |
| LME | London Metal Exchange |
| OMLX | OM London Securities and Derivatives Exchange |
| PPS | Protected Payments System |
| RCH | Recognised Clearing House |
| RIE | Recognised Investment Exchange |
| SEAQ | Stock Exchange Automated Quotation |
| SEAQI | SEAQ International |
| SEATS | Stock Exchange Automated Trading Service |
| SETS | Stock Exchange Electronic Trading Service |
| SFD | Settlement Finality Directive |
| SLRC | Stock Lending and Repo Committee |
| SME | small and medium-sized enterprises |
| USRs | Uncertificated Securities Regulations |

Figures quoted in the text are in nominal terms.

All Bank of England publications referred to in the text are available on the Bank's website, <http://www.bankofengland.co.uk>.

Introduction

The allocation of responsibilities amongst the UK financial sector authorities has changed considerably in recent years. In 1997, the role of banking supervision was transferred from the Bank of England to the Financial Services Authority (FSA). On 1 December 2001, the Financial Services and Markets Act (FSMA) 2000 came into force, substantially replacing the previous regulatory framework for financial services and bringing the regulation of securities, banking and insurance under the supervision of a single regulator, the FSA.

Under the Bank of England Act 1998, the Bank has statutory objectives relating to monetary policy; these are to maintain price stability and, subject to that, to support the government's economic policy. It is also required by the 1998 Act to formulate and publish its objectives and strategy. In general terms the objectives (or core purposes) are to:

- maintain the integrity and value of the currency;
- maintain the stability of the financial system, both domestic and international; and
- seek to ensure the effectiveness of the United Kingdom's financial services.

These objectives are reflected in a memorandum of understanding between HM Treasury, the Bank and the FSA to establish the framework for cooperation between the three bodies in the field of financial stability following the decision to transfer banking supervision from the Bank to the FSA.

In the payments industry, the main private sector body is the Association for Payment Clearing Services (APACS), set up in 1985. APACS is a non-statutory association providing a forum for the major banks and building societies to discuss non-competitive issues relating to money transmission. Three operational clearing companies currently fall under the APACS umbrella: CHAPS Clearing Company; BACS Ltd; and Cheque and Credit Clearing Company Ltd.

Most high-value wholesale payments go through the CHAPS (Clearing House Automated Payment System) RTGS system. There is, however, no lower limit on transaction values, and the system can be used for low-value (retail) payments when same-day finality is required. The system offers two separate clearings - one denominated in sterling, the other in euros. CHAPS Sterling moved to RTGS in April 1996, having previously settled on an end-of-day net basis. On 4 January 1999, CHAPS Euro began operations, and connects to the pan-EU TARGET system. Member banks can thus route both domestic and cross-border payments through CHAPS Euro. Since August 2001, with the completion of the NewCHAPS project, CHAPS Sterling and CHAPS Euro have operated on a common (SWIFT-based) technical platform.

There are two retail-oriented payment clearing arrangements in the United Kingdom. The BACS system offers an ACH service handling electronic payment orders, whilst the Cheque and Credit Clearing Company processes paper items such as cheques and credit vouchers. For both these clearings there is a two-tier access structure with direct settlement members and "indirect" participants. Settlement between direct members occurs across accounts held at the Bank of England.

Plastic cards are widely used in the United Kingdom. Credit cards are predominantly issued through the Visa and MasterCard schemes, while the main debit card issuers are SWITCH and Visa debit. Virtually all ATMs are interconnected via the LINK network, which allows the customers of participating institutions to access their accounts from any of these institutions' ATMs.

The Bank of England's role in payment systems is fivefold. First, it is a full member and shareholder of the three main clearing companies and of APACS. Second, it maintains the RTGS processor that is used to apply real-time payments to settlement accounts held with the Bank. Third, in order to allow for the smooth flow of payments through the CHAPS system, the Bank provides the CHAPS banks with additional intraday liquidity through repo agreements. Fourth, the Bank maintains an active policy interest in payment systems. Finally, the Bank is responsible for the oversight of UK payment systems and as such for ensuring that sufficient weight is given to risk reduction and management in such systems' design and operation.¹

¹ The Bank's oversight role is described in *Oversight of Payment Systems* (Bank of England, November 2000).

In the United Kingdom, there are currently four major Recognised Investment Exchanges (RIEs) for securities. By far the largest is the London Stock Exchange, which operates order- and quote-driven markets in UK equities, international equities, UK government and commercial sterling bonds, eurobonds, medium-term notes, depositary receipts and exchange-traded funds. virt-x is an electronic stock exchange, operating an order-driven market in the majority of UK-listed securities and the largest European stocks. Coredeal MTS is a quote-driven market for benchmark corporate bond issues. Jiway, a hybrid order/quote-driven trading system, matching low-value buy and sell orders in a wide range of US and European equities, is part of the OM London Exchange (OMLX).

The United Kingdom has three Recognised Clearing Houses (RCHs): the London Clearing House (LCH), the European Central Counterparty (EuroCCP) and CREST.

LCH provides CCP services to the London International Financial Futures Exchange (LIFFE), the London Metal Exchange (LME), the International Petroleum Exchange (IPE), the London Stock Exchange (for trades on the SETS electronic trading platform) and for a limited number of contracts on the US-based Intercontinental Exchange. It also clears cash and repo transactions in a range of European government (including UK government) and supranational bonds and OTC interest rate swap transactions (with other instruments to be added to both services).

EuroCCP is the CCP chosen to clear for Nasdaq Europe, the pan-European stock exchange.

CREST is the United Kingdom's principal settlement system, and currently settles transactions in UK and Irish equities, government bonds and corporate fixed interest stocks held in dematerialised form. The system is operated by CRESTCo, a private sector company owned by a wide range of financial institutions operating in the securities markets. In 1999, control of the Bank of England's settlement systems CGO (for gilts and non-British government sterling debt) and CMO (for money market instruments) was transferred to CRESTCo, although the Bank of England continues to provide depository services for CMO instruments. Settlement of gilts and non-British government sterling debt was successfully absorbed into an enhanced CREST system in July 2000 and the CGO was closed; work is under way to integrate CMO instruments into CREST, thereby creating a single unified UK securities settlement system (SSS). CREST has also established links to other settlement systems in Europe and North America to enable transactions in foreign securities to be settled in CREST. In September 2002, a merger between CRESTCo and Euroclear was completed. The aim is to have a new settlement platform in place by 2005, although CREST members will for the time being access this platform using the system functionality currently available to them in CREST.

With the closure of the CGO and transfer of the CMO to CRESTCo, the Bank of England now has less direct involvement in trading, clearing and settlement. As well as being a participant in the money, bond and foreign exchange markets, the Bank also provides a settlement bank service for certain customers in CREST and the CMO.

1. Institutional aspects

1.1 The general legal and regulatory framework

The UK payment clearing systems described below have evolved through the actions of commercial institutions and are not, in the main, the subjects of specific legislation or regulatory provisions. The most widely used clearings in value terms are owned and controlled by their members through the clearing companies under the APACS umbrella.

All the settlement members of the APACS clearings are credit institutions authorised under the FSMA 2000, and they account for a very large proportion of the flows through these systems. The FSMA 2000 requires an institution to have prior authorisation before engaging in deposit-taking business in the United Kingdom. In addition, under the mutual recognition (or passport) regime of the Banking Consolidation Directive, credit institutions incorporated and authorised in other EEA Member States are given an automatic authorisation under the FSMA 2000 to carry out in the United Kingdom the activities listed in Annex I to the Directive. These passporting institutions are supervised for prudential purposes by the supervisory authority of their home state, and for the purposes of conduct of business regulation by the FSA.

There are principally four pieces of legislation that relate to the provision of payment services in the United Kingdom. The Bills of Exchange Act 1882 is a comprehensive codification of the previous law on bills of exchange, while the Cheques Acts, 1957 and 1992, modify the general principles of the 1882 Act as applied to cheques. More recently, the Deregulation (Bills of Exchange) Order 1996 allowed for the electronic truncation of cheques (see Section 3.4.4 below).

UK competition law relevant to payment systems is largely embodied in the Competition Act 1998. The United Kingdom's clearing systems and their membership criteria are (in addition to any EU competition law aspects) therefore subject to the provisions of this Act and the scrutiny of the Director General of Fair Trading in exercising the various powers available under that Act.

In December 2000, the government published a consultation document, *Competition in Payment Systems*, proposing that the Director General of Fair Trading should be given new powers aimed at promoting effective competition in payment systems for the benefit of consumers and businesses. The follow-up response to this consultation, published in August 2001, confirmed the government's intention to legislate. In the light of this, the United Kingdom's Office of Fair Trading set up a department to prepare for and administer any new regime.

The EC Directive on cross-border credit transfers was implemented in the United Kingdom by the Cross-Border Credit Transfers Regulations 1999, which clarifies the responsibilities of institutions participating in the sending, processing and receipt of cross-border credit transfers. This has been followed by an EC Regulation on the pricing of cross-border payments in euros, which was transposed into the national law of all EU member states in December 2001.

Moreover, the EC e-money Directives of September 2000 relating to the taking-up, pursuit and prudential supervision of issuers of electronic money have also been implemented in the United Kingdom. The FSA is the body responsible for supervising the activities of all e-money institutions.

In the United Kingdom, securities may generally be held in certificated or in uncertificated (or dematerialised) form. The Uncertificated Securities Regulations (USRs) 1995 provide for the dematerialisation of UK equities, and enabled the CREST book-entry transfer system to be introduced in July 1996. They were re-enacted with modifications in November 2001 as the USRs 2001. CREST is subject to regulation by the FSA, both as an RCH under the FSMA 2000 and as the operator of a relevant system under the USRs 2001.

Recognition of UK RIEs and RCHs is the responsibility of the FSA. Together with the four securities RIEs mentioned in the Introduction, LIFFE, the IPE, the LME and the OMLX are RIEs. LCH, EuroCCP and CRESTCo are RCHs. RIEs and RCHs are required to meet a range of criteria including maintaining adequate arrangements and resources for the effective monitoring and enforcement of their rules and, for RIEs, the provision of orderly markets. In return, they are exempted from many of the requirements applied to investment firms by the FSMA 2000.

Under Part VII of the Companies Act 1989, special protection is available for transactions carried out on RIEs and cleared through RCHs. Market contracts, the provision of margin, market charges entered into in connection with transactions on an RIE or RCH, and action taken under the default rules of an RIE or RCH are all protected from the adverse operation of certain provisions of insolvency law. The forms of protection provided for in the Companies Act were extended to cleared OTC transactions in 1998.

Similar protection is now accorded to payment and securities settlement systems, with the implementation in the United Kingdom of the EC Settlement Finality Directive (SFD) by the UK Financial Markets and Insolvency (Settlement Finality) Regulations (FMIRs) 1999. The protection under the FMIRs is conferred only upon those systems that have been formally designated under the regulations. The Bank of England is responsible for designating payment systems, and the FSA for designating securities settlement systems (SSSs). In the case of embedded payment systems - ie those SSSs through which payment transfer orders are also effected - the FSA is obliged to consult with the Bank of England. To date, the Bank of England has designated CHAPS Sterling, CHAPS Euro and, most recently, CLS. The FSA has designated CREST.

1.2 The role of the Bank of England

Statutory and oversight responsibilities

The Bank of England has a payment system oversight function which is recognised in its three core purposes and in a memorandum of understanding with the FSA and HM Treasury (see further the description of the Bank's objectives in the Introduction above). Reference has also been made in Section 1.1 above to the role of the Bank in relation to the designation of systems for the purposes of the SFD.

The Bank of England does not currently own any interbank payment networks, but it does operate the real-time processor at the centre of the NewCHAPS system. This processor also performs final settlement of the BACS system, the cheque and credit clearings and LINK. Nonetheless, the Bank has a major interest in the quality of interbank payment systems, for a number of reasons. First, the discharge of its responsibilities for the implementation of monetary policy and for the stability of the financial system in the United Kingdom presupposes reliable and efficient clearing and settlement procedures. Second, the Bank of England has a direct operational interest in the main clearings in its capacity as a member of the three clearing companies and of APACS. Third, the nature and extent of risks incurred by participants in payment and settlement systems, arising from both their own and their customers' transactions, are of interest to the Bank of England in its capacity as overseer of UK payment systems.

Banking activities

The Bank of England provides a range of banking services, including accounts and foreign currency payments, to a number of public sector bodies, UK and international financial institutions (including other central banks) and also its own staff. It also holds the settlement accounts of all the members of the APACS clearings, but there is no general requirement for other banks to hold operational accounts with the Bank.

Government departments are not, in general, obliged to hold accounts with the Bank of England. A number of major departments, however, do so in order to facilitate the efficient operation of central government banking operations. Moreover, the Bank of England acts as the clearing agent for the large number of government payable orders² issued through the Office of the Paymaster General (a government department with close links to HM Treasury), the Inland Revenue, the Board of Customs and Excise and National Savings and Investments.

1.2.1 **Provision of cash settlement facilities**

Use of Bank of England accounts for payment purposes

Members of each of the APACS clearing companies must have an account at the Bank of England in order to participate directly in the clearing and settlement process. Banks wishing to become members of one or more of these companies are required to formally apply to the Bank of England for a settlement account. The Bank also provides accounts to facilitate the settlement of obligations arising from clearings external to APACS, in particular the LINK network.

Settlement accounts held at the Bank of England are operated in real time. In the case of CHAPS Sterling and CHAPS Euro, individual credits and debits are applied to settlement accounts on a gross basis. Settlement of the other APACS clearings (and also LINK) is achieved by posting multilaterally netted amounts to these same accounts at specific times during the day. Each credit and debit applied to a settlement account is final and irrevocable from the time it is posted.

The Bank of England is currently in the process of formalising its policy regarding the provision of settlement accounts - see *Bank of England Settlement Accounts: A Consultation Document* (Bank of England, January 2002).

² These instruments are orders informing the payee that the public sector body issuing the order will pay the sum shown upon presentation thereof by a bank or building society; they are therefore similar to cheques.

Provision of credit facilities

The Bank of England has never given any explicit or implicit undertaking to underwrite the settlement operations of the UK clearings. See Section 3.2.5 below for details of the Bank of England's role in providing intraday liquidity.

Pricing policies

The Bank of England's charging policy in respect of its general banking operations is based on the principle of fully recovering the costs of the services it provides.

1.2.2 Provision of securities settlement facilities

The Bank of England has no specific statutory responsibility for the establishment or operation of settlement or clearing systems. Since the closure of the CGO in 2000 and the transfer of the CMO to CRESTCo in 1999, the Bank of England no longer provides settlement facilities for British government stock and money market instruments (see Section 4.4 below). Nor does it own or operate any clearing house facilities for equities, foreign exchange or derivative products. The Bank does, however, retain some functions related to registration of government stocks and also acts as a settlement bank in the CREST and CMO systems for a number of its customers.

1.2.3 Participation in other forums

The Bank of England is represented on a number of payments-related committees and working groups organised by the European Central Bank (ECB), the Bank for International Settlements (BIS) and the European Commission.

Domestically, the Bank of England is a member of the APACS Council, sits (as of right) on the Board of each of the three APACS clearing companies, and has a non-executive Director on the Board of CREST. In addition, the Bank has representatives in numerous groups such as the Stock Lending and Repo Committee (SLRC), which it chairs.

1.3 The role of other private and public sector bodies**1.3.1 Association for Payment Clearing Services (APACS)**

APACS was established in 1985 following a review of the organisation, membership and control of the UK clearing systems by the Child Committee, which was set up in 1984 by the banks then participating in the Bankers' Clearing House. The results of the review appeared in a report entitled *Payment Clearing Systems*, published in 1984 (the Child Report). The report's two main recommendations advocated a new structure for the organisation of payment clearing systems and new rules regarding membership of such systems.

Following this report, three separate companies were set up under the APACS umbrella to own and manage the clearings. The shareholders of these companies were the settlement members of the relevant clearings. Separating the clearings into three distinct companies allowed an institution to be a member of one without having to be a member of another.

The three clearing companies currently operating under the umbrella of APACS are responsible for the provision of the main interbank payment clearing mechanisms in the United Kingdom, and for coordinating developments in these systems. This involves running clearings for handling large-value automated transfers (CHAPS Sterling and CHAPS Euro), bulk electronic debits and credits (BACS), and cheques and paper credits (Cheque and Credit Clearing).

CHAPS Clearing Company Ltd is responsible for the large-value RTGS clearings. At present, CHAPS Sterling has 13 members and CHAPS Euro has 20 members. All members of both clearings are banks.

BACS Ltd (known as Bankers' Automated Clearing Services Ltd until 1986) offers an ACH service, providing electronic bulk clearing for direct debits, standing orders and other non-urgent, automated credit transfers. It currently has 14 members, including one building society.

The Cheque and Credit Clearing Company is responsible for the bulk paper clearing of cheques and credits in England, Wales and (since December 1996) Scotland. Paper clearing in Northern Ireland is not included in the APACS structure. It currently has 12 members, including one building society.

During 2001, APACS conducted a wide-ranging review of its governance arrangements. Following this, a number of changes have been implemented, with the result that the individual clearing companies now have an increased degree of autonomy. An aim of this move is to encourage competition in the payments industry.

The Bank of England is a member of APACS and of the individual clearing companies as of right, as well as by virtue of the banking business it conducts and its role in the settlement process. The Bank is thereby entitled to appoint a Director to the Boards of each of the clearing companies and to participate in all of APACS's policymaking committees. The legal powers the Bank enjoys from this representation are no greater than those of other members.

Any institution applying for membership of the major clearing systems must agree to pay an entry fee and a share of the relevant system's operating costs. It must meet the technical and operational requirements of the clearing, and the applicant must also obtain explicit agreement from the Bank of England to provide settlement account facilities for the purpose of settling obligations arising in these clearings.

APACS coordinates the discussion of issues of a non-competitive nature with regard to the payment card industry through the Card Payments Group. Membership of this Group, and of APACS, is open to any credit institution issuing more than 1 million credit, debit, ATM and cheque guarantee cards in the United Kingdom. There are currently 16 members of the Group. From an operational point of view, however, debit card schemes operate independently of APACS and there are also separate arrangements in respect of credit cards and ATM interoperability.

1.3.2 Financial Ombudsman Service (FOS)

The Financial Ombudsman Service provides consumers and small businesses with a free, independent service for resolving disputes with financial firms. Under the FSMA 2000, the FOS replaced all previously existing financial services ombudsman schemes. Complaints regarding the provision of money transmission services are included in the remit of the FOS, and its rulings are binding on all institutions regulated by the FSA. The FOS is also the "redress and complaints" authority for the United Kingdom in relation to the Cross-Border Credit Transfer Directive.

1.3.3 Codes of best practice

A committee to review banking services law (the Jack Committee) was established in 1987 by HM Treasury in association with the Bank of England. Its 1989 report, entitled *Banking Services: Law and Practice*, recommended that banks and building societies in the United Kingdom draw up a Code of Banking Practice, which would set out the standards of good banking practice to be observed in dealings with personal customers in the United Kingdom. It is updated periodically - the most recent edition took effect from 1 January 2001. The Banking Code is produced by the British Bankers' Association (BBA), the Building Societies' Association (BSA) and APACS.

The Code, the provisions of which have been accepted by the majority of banks and building societies providing retail services in the United Kingdom, is concerned with a wide range of banking activities and makes reference to certain payment systems services, including electronic funds transfers. Compliance by the subscribers to the Code is monitored by the Banking Code Standards Board (BCSB).

Since March 2002, the Banking Code has been complemented by the Business Banking Code, which sets out standards of good banking practice to be observed in dealings with business customers. It is produced by the BBA and APACS, and compliance is monitored by the BCSB.

Activities in the securities markets are similarly supported by a range of widely endorsed codes and legal documentation. Equity Repo and Gilt Repo Codes of Best Practice, drawn up under the aegis of the SLRC, set out standards of best practice for repo activity in UK equities and government stock. The SLRC Stock Borrowing and Lending Code of Guidance sets out the basic procedures which UK-based participants in stock lending/borrowing of both UK domestic and overseas securities should observe as a matter of best practice.

2. Payment media used by non-banks

2.1 Cash payments

Under the Bank Charter Act 1844, the Bank of England has the sole right to issue banknotes in England and Wales. The Bank currently prints and issues banknotes in four denominations - GBP 5, 10, 20 and 50 - and these banknotes circulate freely throughout the United Kingdom. Three banks in Scotland and four banks in Northern Ireland retain the right to issue their own sterling banknotes, but, apart from a very small fiduciary issue, these must be covered by holdings of Bank of England banknotes, or of approved coins.³ New banknotes are withdrawn by commercial banks from the Bank of England for distribution through their own cash centres.

The Royal Mint (a government agency) is responsible for the production and issue of coins throughout the United Kingdom. Coins are currently in general issue in eight denominations: 1 penny, 2, 5, 10, 20 and 50 pence, and GBP 1 and 2. A millennium commemorative GBP 5 crown was also issued in 1999. The Royal Mint meets demand by delivering coins to bank cash centres against payment by the banks.

Discussions between the wholesalers of cash (the commercial banks and the Post Office), the Bank of England and the Royal Mint are held under the auspices of the APACS Cash Services Group, the industry body for cash-related issues. The work of this Group covers all non-competitive issues concerning banknotes and coins.

At the end of January 2002, the value of banknotes in circulation totalled GBP 30.5 billion. APACS estimates that, in 2000, cash payments accounted for 74% of all transactions by volume (down from around 86% in 1984).

2.2 Non-cash payments

2.2.1 Credit transfers

The usage of paper-based credit transfers has tended to fall in recent years. The total volume of interbank paper credits cleared in the United Kingdom, for example, declined from 188 million items in 1990 to 161 million items in 2000, over which period the values processed fell from GBP 117 billion to GBP 86 billion. Paper-based credits, which are processed by the Cheque and Credit Clearing Company, are most often used for making consumer payments to large organisations (eg utilities and mail-order companies). They can also be used for payments to individuals, but this is increasingly rare.

CHAPS remains the main vehicle for transferring high-value automated credits that need to be settled on a same-day basis. A general rise in the number of transfers and values processed by this system has continued in recent years; average daily traffic through CHAPS Sterling rose from 31,000 items, valued at GBP 75 billion, in 1990 to 86,000 items, valued at GBP 195 billion, in 2000. On a peak day, CHAPS Sterling has processed over 200,000 payments and has handled daily values in excess of GBP 310 billion (the equivalent of over one third of annual UK GDP). In 2000, CHAPS Euro handled a daily average volume of around 13,000 domestic and cross-border payments, with a value of around EUR 160 billion. CHAPS Euro is currently the second largest cross-border component of the TARGET system by both volume and value.

The great majority of interbank electronic credits (including standing orders) are processed by BACS Ltd, although these are mainly small and medium-value items. Standing orders are used largely by individuals for the payment of regular fixed sums. After a period of decline during the early 1990s, as companies and other institutions encouraged customers to make greater use of direct debits, the total

³ This is subject to the provisions of the Bankers (Northern Ireland) Act 1845 and the Bank Notes (Scotland) Act 1845. Bank of England banknotes may be regarded as legal tender in England and Wales. Coins are legal tender throughout the United Kingdom, subject to certain limits as specified by the Currency Act 1983. Banknotes issued by banks in Scotland and Northern Ireland are not legal tender.

volume of such orders has been increasing over the past five years. The number of standing orders processed by BACS in 2000 was 247 million, up from 216 million in 1995.

There has also been an appreciable rise in the number (and value) of credits other than standing orders handled by BACS, which rose from 514 million items in 1990 to 1,060 million items in 2000. In the past, such credits tended to be used mainly for the disbursement of regular bulk payments such as salaries and wages. Increasingly, however, they are also being used for other transactions, such as one-off payments to business suppliers, and to make consumer payments initiated through telephone and PC banking.

BACS has also developed a separate credit transfer system for domestic euro transactions, which operates in a similar way to its sterling direct credit service. A number of members now offer the euro service to their corporate customers. However, the number of payments cleared through the BACS euro scheme remains very low. Annual volume in 2000 was around 6,300 items, with a total value of around EUR 390 million.

2.2.2 Cheques

As with paper-based credit transfers, the volume of payments cleared by means of cheques has fallen both in absolute and in relative terms since 1990. The number of interbank and interbranch items processed in the United Kingdom fell from 3,210 million in 1990 to 2,286 million in 2000. Cheques nevertheless still accounted for around 24% (by volume) of non-cash payments in 2000, and the values processed annually between 1990 and 2000 actually rose from GBP 1,329 billion to GBP 1,670 billion.

Payment by cheque to retailers is generally acceptable at the point of sale only if the drawer presents a cheque guarantee card issued by the institution on which the cheque is drawn. At the end of 2000, over 56 million cards with a domestic cheque guarantee function had been issued in the United Kingdom by 61 institutions cooperating within the Domestic Cheque Guarantee Card Scheme. The cards may have maximum guarantee limits of GBP 50, 100 or 250 (the amount is printed on the card), and individual institutions are free to choose which limit to offer to their customers. It is common for cheque guarantee cards to also function as a debit card and an ATM card.

The use of cheques at the point of sale has declined dramatically since the widespread introduction of debit cards, but they are still frequently used for the remote payment of utility bills and for business-to-business payments.

The Cheque and Credit Clearing Company has developed a euro bulk paper clearing to handle UK-issued cheques drawn in euros and presented in the UK cheque clearing. However, the number of payments cleared through the euro scheme remains very low, with annual volumes in 2000 of around 154,000 (for a total value of around EUR 1,500 million).

2.2.3 Direct debits

Direct debits allow recipients of large numbers of payments, such as insurance companies and service utilities, to collect these payments automatically from bank or building society accounts. The account holder must first provide a mandate - either written or over the phone/internet - to the originator in order to allow their bank or building society to pay debits for a variable amount. Interbank transfers originating from the direct debit process are cleared through BACS.

Under the rules of the Direct Debit Scheme, should any money be taken in error, then the customer's bank or building society must, on request, make an immediate refund to the customer's account - this is the Direct Debit Guarantee. The Guarantee covers situations where the originator has not given the required advance notice regarding a change of amount or date, and also protects customers should an incorrect amount be debited, or if a debit occurs earlier than the specified agreed date, or in error.

The use of direct debits grew rapidly in the late 1980s, with the increase in the number of direct debits processed amounting to around 20% per annum. The annual growth in volumes has slowed since 1990, but was still 7.9% in 2000. In that year, just over 2 billion direct debit items, worth GBP 485 billion, were processed by BACS, up from 846 million items with a total value of GBP 250 billion in 1990. In order to have greater control over their receipts and to reduce administrative costs, many companies have encouraged their customers (sometimes via financial inducements) to adopt direct debits.

2.2.4 Payment cards

There has been rapid growth in EFTPOS in the United Kingdom over recent years. At the end of 2000, there were around 735,000 EFTPOS terminals in the United Kingdom, up from 530,000 in 1997. These terminals accept credit cards, charge cards and debit cards.

Debit cards

Two debit card schemes were introduced in the late 1980s, and a large number of UK banks and building societies now provide their customers with debit card facilities. UK debit cards enable cardholders to make payments which are automatically debited from their current accounts, usually one or two days after the transaction has taken place.

The Switch scheme was launched in October 1988. By the end of 2000, the number of cards issued by UK banks and building societies under this scheme (Switch and Solo cards) had risen to 24.3 million, up from 11.4 million in 1990. Visa Delta was launched in February 1991, though UK-issued Visa debit cards had existed under different brand names since late 1987. A separate Electron brand was introduced in 1997. At the end of 2000, there were 25.4 million Visa debit cards in circulation, up from 7.5 million in 1990.

Both Switch and Visa debit cards can be used at EFTPOS terminals and remotely (via phone, mail or internet). Although these schemes allow cardholders to make payments overseas, they are primarily domestic schemes.

Visa Electron and Switch Solo cards are completely online debit cards. Both of these products operate in the same way as conventional UK debit cards, except that they require every transaction made to be authorised online, regardless of value. This allows them to be issued to customers who would not normally qualify for a debit card.

During 2000, UK-issued debit cards were used for over 2,300 million purchases in the United Kingdom, up from 192 million purchases in 1990. The number of debit card transactions now exceeds both credit card usage and the number of guaranteed cheques drawn at the point of sale. The average size of debit card domestic transactions (approximately GBP 33 in 2000) tends, however, to be lower than for those where payment is effected with credit or charge cards (approximately GBP 60 in 2000).

A number of retailers offer "cash back" facilities operated through the electronic point-of-sale systems in their stores. These facilities enable holders of debit cards to obtain cash as well as goods. It is estimated that there were 201 million cash back transactions in 2000.

Credit and charge cards

Credit cards issued by banks and building societies generally have a credit facility with a preset limit. Customers' credit card accounts are separate from their bank accounts, which may well be with another bank or building society, and cardholders receive a statement of the outstanding balance on their credit card account on a regular basis (usually monthly). Cardholders may either pay off the full amount of the balance, or they may choose to pay a portion (usually a minimum of 5%) of the total amount outstanding. Where the full balance is not settled each month, interest is generally charged on the outstanding balance from the date the transaction appears on the cardholder's statement, although the specific interest charging arrangements vary between credit card companies. From February 1990, a number of banks also started to charge their credit cardholding customers a flat rate annual fee, although this is often waived when a certain level of annual usage is achieved.

Until 1988, individual banks issued either Visa or MasterCard credit cards. In that year, four banks (Barclays, Lloyds, Midland and National Westminster) took up direct membership of both Visa and MasterCard, sometimes offering customers a choice of different terms for repayment. The credit card market is now very open, with a large number of new entrants in recent years. Of particular note is the number of specialist US credit card-issuing banks, which are now offering a range of different cards aimed at different payment behaviours. At the end of 2000, there were 37 UK issuers of Visa credit cards and 27 UK issuers of MasterCard credit cards.

By the end of 2000, there were 47.1 million credit cards and 3.8 million charge cards in issue in the United Kingdom. During that year there were 1,451 million credit and charge card purchases in the United Kingdom, valued at around GBP 87 billion. Over recent years, there has been a gradual decline in the number of charge cards as a proportion of the total market for credit and charge cards. Charge cards also tend to be used for more costly transactions than credit cards - in 2000, the

average transaction value per card was GBP 113, more than double the average transaction value of GBP 52 per credit card.

Retailer cards

Many retailers issue their own "in-store" cards. These typically only serve one store group and many operate on the basis of a revolving credit facility. This method of payment has not, however, proved to be popular with consumers. Indeed, in 2000, there was an estimated fall of 6 million - to 125 million - in the annual number of proprietary card payments made in the United Kingdom.

A recent trend is for retailers, particularly supermarkets, to offer banking services, either in their own right by obtaining a banking licence (for example, Marks & Spencer and J Sainsbury), or in conjunction with a commercial bank. An example of the latter is the Tesco supermarket group: in partnership with the Royal Bank of Scotland, Tesco now offers a Visa credit card, an instant access savings account, insurance products and an account which allows withdrawals at ATMs and debit card payments.

Electronic money

E-money activities in the United Kingdom are currently very small-scale. The two most significant pilot schemes, Mondex and Visa Cash, have now both closed, although a few campus-based trials remain. Nonetheless, other potential e-money providers (including several internet-based schemes) are preparing to enter the market in the United Kingdom.

At its peak, there were approximately 13,000 cardholders involved in the Mondex trial. Cards could be loaded from an ATM, with a special telephone, or by card-to-card transfer using an "electronic wallet". The majority of transactions were for less than GBP 20, and the average load amount was GBP 28. Approximately 60,000 cards were issued by the Visa Cash scheme, but the value stored on these cards could only be transferred to participating retailers - not to other cardholders.

Following consultations by HM Treasury and the FSA, the EC Directives on e-money have been incorporated into UK law. This move makes the issue of e-money in the United Kingdom a regulated activity under the FSMA 2000. There will, however, be a provision for small issuers to apply for a waiver from regulation by virtue of their small size or limited area of operation. The intention is to ensure an equitable application of the Directives for both bank and non-bank issuers of e-money.

Automated teller machines (ATMs)

At the end of 2000, around 34,000 ATMs were in service in the United Kingdom, double the number of machines at the end of 1991. Almost all of these are connected via the LINK interchange network, which allows customers of participating banks and building societies to access their accounts through the ATMs of any member institution. In 2000, there were over 2 billion ATM withdrawals, with a total value of around GBP 113 billion.

In addition to cash withdrawals, many ATMs enable their users to order new cheque books or statements and make balance enquires and deposits. More advanced ATMs allow customers to make bill payments, funds transfers, standing order enquiries, and to order mini account statements.

The majority of ATMs are located within banking halls or in the external fabric of banks' and building societies' branches. There is, however, a trend towards the remote siting of ATMs in locations such as motorway service areas, railway stations and supermarkets. Such sites now account for over a third of all ATM locations.

2.2.5 Postal instruments

Cashless payments can also be made through the Post Office. Postal orders can be used for small-value payments, and these are particularly convenient for those who do not have a bank account.

2.3 Recent developments

In February 2000, LINK, the United Kingdom's principal cash machine network, opened membership to non-financial institutions (without a sponsoring bank), prompting a number of independent ATM providers to join the network. Between them these firms had, by end-2000, set up over 5,000 new convenience cash machines. Each new member has to meet stringent technical and security criteria

before being permitted to join the network. The new machines are mainly sited in retail outlets. Any decision on charging is up to the ATM owner, but the vast majority of banks do not charge for the use of their machines.

APACS is currently managing a programme to improve the security of plastic cards in the United Kingdom. Card fraud, the majority of which arises from transactions made using counterfeit cards, has been increasing over recent years. Total fraud losses in 2000 reached nearly GBP 300 million, a rise of 55% on the 1999 figure. The UK banking industry is combating this problem by issuing cards with embedded microchips, commonly known as chip cards. It is intended that all UK debit, credit and charge cards will have been upgraded by the end of 2004.

Moreover, all credit and debit card transactions at the point of sale will, by 2005, be authorised by the customer keying in a PIN (personal identification number) rather than by signing a receipt. A public trial is planned for 2003. The combination of highly secure chip cards together with the use of PINs is expected to dramatically reduce the losses arising from card fraud.

3. Interbank exchange and settlement systems

3.1 General overview

In the United Kingdom, the main interbank payment networks are CHAPS (Sterling and Euro), BACS, and the cheque and credit clearings. Together these systems, all of which currently operate under the umbrella of APACS, process the vast majority of funds transfers between UK financial institutions.

The two CHAPS clearings are RTGS systems primarily designed for high-value payments, although there is no lower (or upper) limit on the value of payments that may pass through the clearings. Three other major interbank payment systems (BACS and the cheque and credit clearings) deal with high volumes of relatively small-value payments, although they are able to accommodate non-urgent large-value transfers if required.

All three "retail" clearings work on a three-day processing cycle and are not suited for use by those wholesale financial markets (eg foreign exchange and money markets) which are geared to shorter settlement cycles. As a result, the average value of transactions in these clearings is much smaller than for those processed through either of the CHAPS clearings. The average value of individual payments passing through the UK clearings in 2000 ranged from GBP 580 in BACS to around GBP 2.3 million in CHAPS Sterling.

In order to facilitate the operational side of making payments, a nationwide system of unique codes is employed to identify clearing members and, at each clearing member's discretion, their branches and major customers. These sort codes are printed, together with a code identifying the customer's account, on such instruments as cheques and giro credits in machine-readable form.

3.2 CHAPS

CHAPS started operating in 1984 as a nationwide, electronic interbank system for sending irrevocable, guaranteed and unconditional sterling credit transfers. Final settlement took place on an end-of-day multilateral net basis. In April 1996, CHAPS was developed into an RTGS system and now handles nearly all large-value same-day sterling payments between banks. The average daily value of payments passing through the CHAPS Sterling system was GBP 195 billion in 2000 and, on a peak day, the system has processed transfers with a total value of GBP 318 billion. There are currently 13 direct participants in CHAPS Sterling.

In January 1999, a second CHAPS system - for euro-denominated payments - was launched. CHAPS Euro connects to the TARGET system, which links together the RTGS systems of the 15 EU states and the European Central Bank. This provides member banks with the ability to make and receive cross-border as well as domestic payments in euros. A total of 20 banks, including two remote participants, are members of CHAPS Euro. Of these, 12 banks (including the Bank of England) are also members of CHAPS Sterling.

With the introduction of an enhanced RTGS service called NewCHAPS in August 2001, CHAPS Sterling and CHAPS Euro now operate on a common technical platform. The new platform, which is based on the SWIFT FIN Copy Financial Application service, enables member banks to manage their outgoing payments using a central scheduler and also to obtain real-time payment flow information via the "Enquiry Link" facility.

3.2.1 Operating rules

The CHAPS Clearing Company Ltd sets the operational rules for the CHAPS clearings and is responsible for the development of the network. The settlement members of CHAPS are involved in setting these rules through their membership of the Company's Board and its subcommittees.

3.2.2 Participants in the system

The direct members of the CHAPS clearings are the institutions responsible for settling all transfers, and consequently all interbank obligations arising through this system. Other financial institutions are able to make and receive payments through CHAPS by virtue of agency agreements with settlement members. Individual bank customers can also route urgent payments (property purchase transactions, for example) via CHAPS. These transfers are described as customer payments and use a different SWIFT message format from transfers arising from banks' own activities (interbank payments).

3.2.3 Types of transaction handled

There is no restriction on the type (or value) of transaction handled provided it is an unconditional payment denominated in either sterling or euros. A significant proportion of CHAPS payments, by value, originate in the foreign exchange market and other wholesale markets owing to their requirement for a prompt settlement service. The CHAPS system is, however, also used to facilitate same-day transfers arising from a range of other activities (eg general commercial transactions and the purchase of domestic property), and the value of individual transfers can be quite small.

3.2.4 Operation of the system and settlement procedures

Both CHAPS systems currently open at 6 am. The standard closing times for CHAPS Sterling and CHAPS Euro are 4.20 pm and 5 pm respectively,⁴ although for both systems the deadline for submitting customer payments is 4 pm. Most settlement members will, however, negotiate cutoff points with their customers, so that any payment requests received after a set deadline will be handled on a "best efforts" basis. From 4.20 pm until 5 pm, the CHAPS Sterling settlement banks are able to use the Enquiry Link facility to make (interbank) transfers under the Late Transfer Scheme.⁵

Each CHAPS payment is settled at the Bank of England before details are sent to the receiving bank. When a payment message is submitted to the SWIFT network, it is held in the FIN Copy service while a settlement request (a subset of the information contained in the main message) is sent to the Bank of England. Only if the sending bank has sufficient funds on its account does the Bank of England settle the transaction by debiting the account and crediting the receiving bank. The Bank then returns a confirmation message to the FIN Copy service. As soon as this confirmation is received, the main message containing the full payment details is released automatically to the receiving bank, which has the assurance that it has received final and irrevocable funds on its account at the Bank of England.

According to CHAPS Clearing Company rules, members should only forward settlement requests to the Bank of England when they have sufficient funds on their settlement account to allow the transaction to be processed immediately. The settlement banks must therefore manage their outgoing payment stream, and this can be done using either the NewCHAPS central scheduler or their own internal systems. In order to facilitate efficient queue management, each member is able to obtain

⁴ The different closing times arise from the requirement that CHAPS Euro observe the TARGET timetable.

⁵ The Bank of England must sanction all transfers made under this scheme. The receiving bank must also confirm that it is prepared to accept the funds.

details of its account balance, a summary of its CHAPS payments settled and a listing of various non-CHAPS items it has paid or received by making use of Enquiry Link.

There are no provisions in the CHAPS rules for revocability, but where a payment has been made in error, the receiving settlement member is required to send an offsetting transfer back to the original sender by no later than 12 noon the next day. The central systems at the Bank of England include a facility to allow settlement requests which have been mistakenly forwarded to the RTGS system (but which have not yet been settled) to be cancelled at the request of the sending bank.

As a form of contingency, the NewCHAPS platform provides (for both CHAPS clearings) functionality known as circles processing. This allows queued payments held at two or more banks to be forwarded to the central RTGS accounting system at the Bank of England and settled simultaneously, although still in gross form. This is a useful mechanism to address situations where there may be insufficient liquidity to allow each payment in a given set to settle sequentially, but where the available funds would permit these to be settled collectively. While this facility assists in preventing blockages (gridlock) from arising, it is not used routinely during the course of each day, given that the CHAPS banks have access to additional intraday liquidity to ensure that all payments can be made (see Section 3.2.5 below).

In order to guard against the failure of the central RTGS platform, the Bank of England's real-time accounting system is duplicated at a remote standby site. All entries to accounts held at the main site are copied to this second location and the standby site is able to take over the functions of the main site if its ability to operate is impaired. As a final resort, the CHAPS clearings both have the ability to operate as net end-of-day systems in the unlikely event that both the primary and secondary sites are rendered inoperable.

Each settlement member has its own contingency arrangements to address the possibility of an internal systems failure during the day. These may take a variety of forms and are the responsibility of the individual member.

3.2.5 Provision of credit facilities

At the end of each business day, the CHAPS members are expected to have credit balances on their settlement accounts (both sterling and euro). A penalty is applied where banks incur an overnight overdraft. The provision of intraday liquidity to settlement banks, however, is regarded as necessary for the efficient operation of the CHAPS system, as the funds held by the clearing banks on their settlement accounts overnight typically represent only a very small proportion of the total values passing through CHAPS and the other clearings each day.

Banks in the United Kingdom are not subject to reserve requirements for monetary policy purposes. They are, however, obliged to hold cash ratio deposits (CRDs) with the Bank of England. CRDs are non-interest bearing deposits which are calculated as a percentage of each bank's eligible liabilities (currently 0.15% of all liabilities in excess of GBP 400 million). Prior to the introduction of RTGS, these sums were not available for use in the settlement process, but, in order to provide additional liquidity, the CHAPS Sterling banks are now allowed to make payments against these deposits during the day. They are required to reinstate them by the time the RTGS system closes.

An additional intraday credit facility is provided by the Bank of England through the sale and repurchase (repo) of eligible assets.⁶ CHAPS Sterling members are able to repo an unlimited amount of eligible assets to the Bank at any time during the business day, but all repos must be reversed by the end of the day. For the CHAPS Euro members, there is a constraint on the total amount of intraday liquidity available from the Bank of England. The arrangements under which the Bank, as a non-euro area national central bank, is able to provide intraday credit in euros are laid down by the Governing Council of the ECB. At present, the maximum amount of credit permitted in aggregate across all participants is EUR 3 billion, and the maximum for an individual participant is EUR 1 billion.

⁶ A list of the assets eligible for intraday repo is maintained on the Bank of England's website, <http://www.bankofengland.co.uk>.

3.2.6 Pricing policies

Settlement members of either of the CHAPS systems have to pay an entry fee to the CHAPS Clearing Company upon joining the system, and also an annual charge to CHAPS to cover their share of the system's operating costs. Members do not have to pay any per-item fees to the CHAPS Clearing Company for the use of the CHAPS system.

The Bank of England charges a per-item tariff in respect of each CHAPS Sterling transfer settled using the RTGS processor, plus an annual fee for each settlement account, in order to cover the costs of running its real-time accounting system. The costs of the Enquiry Link facility are recovered by an annual charge levied on each terminal connection. Similar principles are applied to domestic CHAPS Euro payments, but cross-border TARGET payments (including those initiated via CHAPS Euro) between participants throughout the system are subject to a separate pricing framework as laid down by the Governing Council of the ECB, under which there is a digressive per-item charging regime.

The fee a settlement member charges its customers for a CHAPS transfer (sterling or euro) is a matter for commercial negotiation between the parties concerned. These charges may be on a per-item basis or as part of a package negotiated by the bank with its customer.

3.2.7 Future developments

The introduction of Continuous Linked Settlement (CLS) in the foreign exchange market is likely to have a significant impact on both the CHAPS clearings. The newly created CLS Bank commenced operations in September 2002, and APACS estimates that this could ultimately reduce volumes in CHAPS Sterling and CHAPS Euro by 10% and 50% respectively.

Moreover, the liquidity requirements of several CHAPS members have changed as a result of CLS. CLS settlement members are now required to meet a number of pay-in (to CLS Bank) deadlines during the morning, and must therefore have sufficient funds available at the required time. The full impact of this will only become apparent once CLS has been operating for a number of months.

3.3 BACS

BACS is an ACH responsible for clearing bulk electronic transfers in both debit and credit form, and now processes the great majority of electronic interbank funds transfers in the United Kingdom. The clearing is operated by BACS Ltd. The service (which began operating in 1968 as the Interbank Computer Bureau) was established to provide a more efficient method of handling interbank transfers by means of magnetic tape rather than paper instruments, although BACS transfers are now exclusively input through telecommunications links.

3.3.1 Operating rules

BACS Ltd sets operational rules for users and for the banks and building societies which act as settlement members of BACS. Settlement members are involved in setting these rules through their membership of the company's Board and its subcommittees. BACS currently operates under the umbrella of APACS.

3.3.2 Participation in the system

The membership of BACS consists of the Bank of England, 12 commercial banks (representing 10 separate banking groups) and one building society. These credit institutions are the shareholders of BACS Ltd, and are responsible for settling all interbank obligations arising from the BACS clearing process. Settlement members must meet the membership criteria set out by BACS Ltd.

Members of BACS are also able to sponsor other organisations as users of the service. Users are allocated a BACS user number by their sponsor and are able to submit payment instructions directly to the system. There are in the region of 60,000 users, including a wide range of commercial and public sector bodies, along with many other indirect users who submit instructions via an intermediary.

3.3.3 Types of transaction handled

BACS clears sterling-denominated standing orders, direct debits and direct credits. It has also recently introduced a separate credit transfer system for domestic euro transactions (see Section 2.2.1 above). There is no restriction on the value of individual payment instructions submitted to BACS, although in practice the vast majority of transfers processed are of low value.

3.3.4 Operation of the system and settlement procedures

Users submit payment data to the BACS clearing house through BACSTEL, a telecommunications service which offers direct connection to the BACS computer centre. Some of the major users of the system use direct high-speed links. BACS sets common standards for the format in which payment information is supplied, and users may submit payment instructions between two and 71 days ahead of the date for payment.

Payments submitted to BACS are subject to a three-day clearing and settlement cycle. The deadline for receipt of payment information from users is 10.30 pm (UK time) on Day 1 of the cycle. These data are then sorted into bank order at BACS and transmitted onward to destination credit institutions. A destination bank may be either a receiving bank or a paying bank depending on whether the transaction under consideration is a credit or a debit. This process should be completed by 6 am the following day (ie Day 2). The paying bank receives a report confirming each submission on Day 2. On Day 3, transfers are debited/credited to respective payer/payee accounts, usually at the beginning of the operating day.

The interbank obligations that arise in BACS are settled at the Bank of England on a multilateral net basis on Day 3 of the clearing cycle. This occurs at 9.30 am each day by posting the multilateral net amounts directly to the members' settlement accounts using the RTGS processor.

Each settlement member is responsible for settling the payments generated by the users it sponsors. There is no system of limits or other controls within BACS itself to inhibit the numbers or value of payments for which a particular settlement member is responsible. The extent to which a user can initiate BACS transfers and its arrangements for funding the resultant outflow are a matter to be decided bilaterally with its settlement bank.

3.3.5 Pricing

BACS Ltd applies tariffs to the sponsoring banks of users in respect of both incoming and outgoing payment messages. The sponsoring banks negotiate independently with users and other customers the charges which they will incur as a result of generating BACS transfers or receiving credits through this medium.

3.3.6 Future developments

BACS has announced a major technology renewal programme to meet the rapidly growing demand for electronic payments and to integrate the latest security methods. This programme is known as "NewBACS" and is scheduled for completion by 2005.

3.4 Cheque and credit clearings

The Cheque and Credit Clearing Company, which currently operates under the umbrella of APACS, is responsible for the cheque and paper credit clearings for England, Wales and (since December 1996) Scotland. A separate clearing operates in Northern Ireland under local paper clearing arrangements, and this falls outside the APACS structure.

3.4.1 Operating rules

Although the cheque and credit clearings are managed by the same body and have the same set of settlement members,⁷ they are distinct clearings subject to their own rules. The rules of each are set out by the Cheque and Credit Clearing Company.

3.4.2 Participation in the system

The Cheque and Credit Clearing Company has 12 direct settlement members, which settle all interbank items passing across the two clearing arrangements. The membership includes the Bank of England, 10 commercial banks (representing nine separate banking groups) and one building society. Settlement members must meet the membership criteria laid down by the Company. Other banks and building societies can have access to both clearings through agency arrangements with the direct members.

3.4.3 Types of transaction handled

The cheque clearing and the credit clearing systems handle paper debit items (ie cheques) and credit items (ie bank giro transfers) respectively. Cheques processed through the cheque clearing and paper credits passed through the credit clearing must meet the physical specifications (relating to layout and paper specifications) laid out in the rules of the relevant clearing. There are, however, no restrictions on the value of individual transfers or on the economic nature of the original transaction.

3.4.4 Operation of the system and settlement procedures

The cheque and credit clearings both operate on a three-day payment and settlement cycle, although an additional day is sometimes necessary for items requiring cross-border clearing between England and Scotland.

Clearing

A cheque presented to a branch of a member bank during banking hours will usually be processed by the collecting bank that day. This may involve the magnetic encoding of the value of the cheque in the pre-existing codeline at the bottom of the cheque, but members are moving towards the adoption of new technologies, such as imaging reading, that will circumvent the need for this.

Early the following day, cheques are sent to the collecting bank's clearing centre. Here the cheques are automatically "read" by machines, which evaluate the codeline and sort the cheques by drawing bank. The codeline data are then transmitted over the Interbank Data Exchange (IBDE) network, which is currently operated by BACS. These data are primarily used as a check on the paper delivery, but also allow the paying bank to begin updating customer accounts before the paper items arrive.

Having been sorted, the cheques are sent by the collecting bank to the Clearing Exchange Centres (one in London and one in Scotland), where they are passed to the paying bank. The Clearing Exchange Centres are open between 6.30 and 11 am each day. Received cheques are then processed by the paying bank's clearing centre to verify the value of settlement between itself and other settlement members and to sort the cheques between its own branches.

The cheques are then packaged ready for delivery to the individual branches on which they are drawn, although a change in the law in 1996 removed the requirement for cheques to be presented physically.⁸ Electronic data are now a legally acceptable form of presentation, and many banks are now retaining cheques at their head office or clearing centre. This is known as paying bank truncation.

Whether in physical or electronic form, the cheques will arrive at the relevant branch by the third day of the clearing cycle. Branch staff then review them to see whether the instruments in question should be

⁷ Members of the Company operate as settlement members of both cheque clearing and credit clearing; they do not have the option of being a member of only one of these two payment systems.

⁸ The relevant legislation is the Deregulation (Bills of Exchange) Order 1996.

accepted or returned. The point at which the collecting bank credits funds to the payee's account and allows the payee to draw against these is a commercial decision and varies between banks.

Paper credits, for which the collecting bank is generally the payer's bank, follow a reverse process to cheques. The processing procedures for the credit clearing are very similar to those employed in the cheque clearing, but the codeline data, despite the pre-printed details being more comprehensive than on cheques, are not transmitted over the IBDE network. Moreover, settlement figures for the credit clearing are ascertained by receiving banks once they have read the codeline data.

Settlement

The interbank settlement of items processed through the cheque and credit clearings occurs on the third day of the cycle. In respect of each clearing, multilateral net obligations for each member are transmitted to the Bank of England no later than 10.30 am. Settlement is then effected at 11 am through postings of the net amounts to the members' settlement accounts using the RTGS processor.

There is no system of limits to control the interbank settlement obligations that arise in the cheque and credit clearings. In contrast to CHAPS, the settlement members of these clearings are considered to be acting as agents of their customers rather than as principals. The value of interbank settlement obligations is also typically much smaller.

3.4.5 Pricing

The Cheque and Credit Clearing Company does not impose a per-item charge on cheques or credits handled; its costs are met through direct contributions by shareholders (the settlement members). Banks negotiate charges with their business customers for processing debits and credits arising from paper instruments, but most banks do not impose such direct fees on their personal customers.

3.4.6 Future developments

As mentioned in Section 3.4.4 above, some participants in the cheque clearing have introduced paying bank truncation, whereby the paper instruments are retained at the head office of the paying bank. A major project in the future will be the introduction of collecting bank truncation, although because of the need to examine endorsements and signatures on cheques this is unlikely to occur until cost-effective and sufficiently rapid imaging technology is available.

3.5 Currency clearings

Until recently, a number of currency clearings also operated under the APACS umbrella, catering for paper-based payment orders denominated in major currencies other than sterling and euros, including US dollars, Canadian dollars, Australian dollars, Japanese yen and Swiss francs. In June this year, however, falling volumes prompted the closure of all except the US dollar currency clearing. Reflecting this decision, of the 413,000 items worth GBP 4.8 billion processed by the currency clearings in 2000, the US dollar clearing accounted for 38% by volume and 74% by value.

4. Trading, clearing and settlement

4.1 General overview and recent developments

UK markets

The United Kingdom has major securities markets in UK government stocks, domestic and international equities, debt securities (including eurobonds) and money market instruments. There is also a highly developed market in derivatives based on these and other instruments. The most active participants in these markets are domestic and international banks and securities houses, as well as institutional investors such as pension funds and insurance companies.

Equities, debentures, loan stocks and other securities listed in the United Kingdom are mainly traded through the London Stock Exchange, but some volumes also go through virt-x. Both exchanges also offer trading facilities in a range of overseas securities. UK government stock is mostly traded through gilt-edged market-makers, subject to the rules of the London Stock Exchange. Eurobonds and short-term eurocurrency paper are generally listed in the United Kingdom or on the Luxembourg Stock Exchange, but are traded OTC under the rules of the International Securities Market Association (ISMA). A significant proportion of all eurobond trading takes place in London.

There is also a very large volume of OTC derivatives activity in London and standardised derivatives contracts are traded on LIFFE, the LME, the IPE and the OM London Exchange (OMLX). LIFFE's contracts comprise futures and options on UK and foreign government bonds, short-term interest rates, equity indices and individual equities. The LME and IPE offer contracts on metals and energy products respectively. In addition to providing Swedish equity derivative contracts on an automated trading system linked to that of its parent, the OMLX also operates Jiway and the UK Power Exchange.

Sterling- and euro-denominated money market instruments are traded OTC.

Trading

UK exchanges, clearing houses and settlement systems have undergone significant change in recent years, and this process continues at a rapid pace. Like many of their European counterparts, the United Kingdom's exchanges have responded in a variety of ways to the opportunities offered and challenges posed by the integration of (particularly European) capital markets, technological advances, member consolidation and increases in global cross-border trade.

Both the London Stock Exchange and LIFFE have introduced electronic trading systems. Around 200 securities are traded on the London Stock Exchange's SETS electronic order book, although a significant proportion of trading in these securities continues to take place over the telephone or via automated systems provided by the major market liquidity providers (in particular the so-called retail service providers). Trading in most of the remainder of London Stock Exchange securities is facilitated by a screen-based quotation system called SEAQ (Stock Exchange Automated Quotation), which displays two-way prices from competing market-makers. For less liquid and AIM (Alternative Investment Market) securities, a hybrid market of quotes and orders is used. The London Stock Exchange also supports the SEATS PLUS trading system, a hybrid quote-driven/order-matching system which is used for less liquid securities in addition to securities listed on AIM. virt-x and the OMLX continue to offer electronic order books. The vast majority of LIFFE contracts are now traded on LIFFEConnect. Furthermore, both the IPE and the LME are assessing their members' needs in this respect and plan the limited introduction or expansion of existing screen trading facilities (eg LME Select).

The London Stock Exchange, LIFFE, the IPE and the LME have all demutualised to become for-profit, shareholder-owned institutions. Demutualisation is enabling these exchanges to respond more efficiently to commercial pressures in an increasingly competitive environment. virt-x plc is part-owned by the SWX Swiss Exchange and the TP Consortium (a group of major European securities firms); its shares are traded on the London Stock Exchange's AIM. The OMLX is a part of the OM Group, which is listed on the Swedish Stock Exchange. The London Stock Exchange's shares are listed on its own exchange. Subsequent to their demutualisations, LIFFE has been purchased by Euronext and the IPE by the Intercontinental Exchange (a US-based commodity trading platform run by a consortium of banks, oil and energy firms).

The opportunities offered by these developments have encouraged a number of new and prospective entrants into the UK equity markets. Thus, Jiway offers execution facilities to brokers and other financial intermediaries for transactions below a certain size limit, based on a central order book supported by firm quotes provided by market-makers. Agency brokers such as Instinet and Posit provide matching facilities to institutional investors and brokers. E*Crossnet provides a crossing service to institutional investors. Market-makers and institutional brokers continue to expand the range of crossing and order-routing facilities available to customers.

Similar trends are being seen in the fixed interest markets. Recent years have seen the introduction of a range of electronic inter-dealer and dealer-customer execution and quotation systems. Coredeal MTS (an RIE) and authorised financial intermediaries such as BrokerTec, EuroMTS and Cantor/E*Speed provide inter-dealer execution in a wide range of eurobond and European government bond cash trades and repos. For the time being, UK government bond trading remains

largely telephone-based, with market-makers' quotes being distributed over a variety of quote vendor systems. The UK Debt Management Office is, however, planning to introduce an electronic inter-dealer system with mandatory quote obligations.

Clearing

LCH remains the United Kingdom's principal CCP clearing house, although the OMLX and Jiway also operate in-house clearing facilities. In September 2001, the EuroCCP gained RCH status and has been chosen as the CCP for Nasdaq Europe.

LCH continues to provide CCP services for LIFFE, the LME and the IPE, along with the clearing of cash and repo trades in European government and supranational bonds ("Repoclear", which was expanded to include UK government bonds in August 2002) and plain vanilla interest rate swaps ("Swapclear"). Since 26 February 2001, LCH has acted as CCP for trades on the London Stock Exchange's SETS electronic trading system, in cooperation with CRESTCo; and on 18 March 2002 it began to act as CCP for a limited number of contracts traded on the Intercontinental Exchange. LCH and virt-x have been in discussion with the aim of implementing a CCP for the exchange in March 2003.

Settlement

Settlement is also undergoing a process of consolidation, both domestically and internationally. Again, this process reflects the considerable operational savings and efficiencies and the potential reductions in risk available from rationalisation.

CRESTCo owns and operates the United Kingdom's two settlement systems, CREST and the CMO. Opened in 1996, CREST initially settled UK and Irish equities and corporate bonds. In July 2000, UK government debt was integrated into the system and the CGO was closed. Money market instruments continue to settle in the CMO, but work is under way to integrate them into CREST (by end-2003).

CRESTCo has, in addition, established direct links to CSDs in Switzerland (SIS SegalInterSettle) and the United States (DTCC) and to Euroclear, enabling CREST members to hold securities which settle in those systems. CSDs from the following countries have also established links to CREST: Sweden (VPC); the Netherlands (Necigef); and Australia (CHESS).

Most recently (September 2002), the merger between CRESTCo and Euroclear has taken place. CRESTCo has become a wholly owned subsidiary of Euroclear Bank, but will continue to operate as CRESTCo at least until the launch of the new group's "single settlement engine", planned for 2005.

4.2 Trading

4.2.1 London Stock Exchange

Ownership and governance

In July 2001, the London Stock Exchange listed on its own market and became a fully commercial public limited company. This followed the demutualisation of the company in March 2000. Shares in "London Stock Exchange plc" are now listed and freely traded in the same way as other UK equities.

Regulatory status

The London Stock Exchange is an RIE under the FSMA 2000. Responsibility for the UK Listing Authority, which regulates the United Kingdom's primary market for issuing companies, was transferred to the Financial Services Authority in May 2000.

Participation

The London Stock Exchange has approximately 300 member firms. In order to trade on the Exchange, a firm must become an authorised member firm or a SETS participant.

An applicant for membership must be:

- authorised under the FSMA 2000;

- an exempted person under the FSMA 2000;
- a person whose activities constitute “excluded activities” under the FSMA 2000, whether such activities are carried out in the United Kingdom or elsewhere in the European Union;
- an “overseas person” as defined by the FSMA 2000; or
- a “European institution” as defined by the Banking Co-ordination (Second Council Directive) Regulations 1992 and the Investment Services Regulations 1995.

The London Stock Exchange will also assess the applicant’s suitability for membership by considering the scope of the applicant’s business activities, internal procedures and controls, etc.

Membership is divided into clearing and non-clearing members. Clearing members must satisfy the membership criteria of LCH (see below).

Transactions handled

The following classes of security are admitted to trading on the London Stock Exchange:

- UK equities;
- international equities;
- shares and fixed interest stocks of companies admitted to AIM, which was set up in 1995 for young and fast-growing businesses;
- securities on techMARK, for innovative technology companies;
- securities issued by the UK government (gilts);
- sterling bonds issued by companies or local authorities;
- eurobonds and euro-convertible bonds and medium-term notes issued by UK and international companies;
- depositary receipts; and
- exchange-traded funds.

In 2001, over 595 billion UK equity shares were traded on the London Stock Exchange, representing a turnover value of approximately GBP 1,905 billion. In the same period, approximately 1,208 billion trades in international equity shares were reported to the Exchange, with a corresponding turnover value of GBP 3,676 billion.

System operating procedures

Around 215 stocks are traded on SETS, the Exchange’s electronic order book. The order book includes the FTSE 100, the more liquid FTSE 250 securities, exchange traded funds, selected Irish stocks and other securities suited to order book trading. Anonymous limit orders match continuously throughout the trading day on the basis of price/time priority. Unmatched limit orders and market orders are submitted for auction at the start and end of each SETS trading day, with orders executed at the clearing price which is set to enable the maximum volume of shares to be traded.

Non-SETS securities are traded on a quote-driven market, supported by a number of market display mechanisms. The majority of non-SETS UK equities are quoted on the SEAQ system. The Stock Exchange Alternative Trading Service (SEATS PLUS) is a hybrid market-maker/order book service which supports the least liquid securities. Liquid depositary receipts and blue-chip international securities are traded electronically on the International Order Book and International Retail Service respectively. Other international stocks and less liquid depositary receipts are quoted on SEAQ International (SEAQI).

SEAQ and SEAQI are both quote-display systems used as the reference point for telephone execution between market participants and competing registered market-makers (who are required to quote bid/offer prices). For FTSE 250 stocks, the SEAQ quote-driven market is supplemented by three intraday SEAQ crosses.

Clearing/settlement

In February 2001, the London Stock Exchange, CRESTCo and LCH introduced a central counterparty service (CCP) on a gross basis for trades executed on SETS. With LCH acting as CCP, market participants have full post-trade anonymity and improved management of counterparty risk. The service was expanded in July 2002 with the implementation of settlement netting.

Trades in UK equities and corporate bonds settle through CREST. The standard settlement cycle is three days. Participants may, however, agree to use a different cycle for individual trades ranging from same-day to 25-day settlement. Trades in overseas equities settle through the relevant domestic or international CSD in accordance with local market deadlines.

Operating hours

Trades can be reported to the Exchange from 7.15 am to 5.15 pm London time. Trades executed outside these hours are reported when the system next opens.

The SETS Order Book continuous execution period and SEAQ Mandatory Quote period extend from 8 am to 4.30 pm London time. The SETS opening auction call period runs from 7.50 to 8 am and the closing auction call period from 4.30 to 4.35 pm (with a random end in each case to discourage market manipulation). Auction call periods are automatically extended in the instance of unfilled market orders or price movements greater than defined parameters.

The International Order Book has an opening auction call period from 8.30 to 9 am, and this is immediately followed by a continuous trading period that ends at the start of the closing auction at 3.30 pm. The closing auction call period lasts for 10 minutes subject to a random end and any price or market order extensions.

The International Retail Service mandatory committed principal period is based on that of the home market, subject to a London opening time no earlier than 8 am and end time no later than 5 pm.

SEAQ International quotations may be input between 7.30 am and 5.15 pm London time.

4.2.2 virt-x*Ownership and governance*

virt-x Exchange Ltd is a wholly owned subsidiary of virt-x plc, in which the SWX Swiss Exchange and the TP Consortium each have a 38.9% shareholding. virt-x uses the SWX system and network, including the SWX trading platform, under a facilities management agreement.

Regulatory status

virt-x is an RIE under the FSMA 2000 and is also designated as a “regulated market” under the ISD. virt-x does not have listing authority in the United Kingdom and the procedure for listing of Swiss blue-chip equities is under the authority of SWX.

Participation

virt-x can be accessed by regulated financial institutions from the EEA, Switzerland, Hong Kong and the United States. It currently has 107 approved members, of which 102 are live trading members.

Transactions handled

virt-x provides trading in pan-European blue chips of the major European indices, eg the FTSE 100 and the STOXX 50.

System operating procedures

Using the SWX Swiss Exchange trading platform, virt-x provides a continuous public limit order book with full anonymity prior to execution. Users can access the system either directly through the installation of a virt-x gateway and circuits on the member's premises, through a sponsoring direct member of virt-x (ie as a sponsored user), or through an independent software vendor (ISV) that has access to the virt-x trading system.

Clearing/settlement

All order book trades settle on a T+3 basis, and can be settled in CREST, SIS or Euroclear. Currently, settlement is between trading counterparties; it is envisaged that CCP clearing through LCH and x-clear will be introduced in March 2003.

Operating hours

virt-x trading hours are from 8 am to 4.30 pm London time.

4.2.3 Coredeal MTS

Ownership and governance

In November 2001, Coredeal entered into a partnership with EuroMTS (the leading pan-European trading platform for government benchmark securities). Coredeal MTS, which began trading on 1 February 2002, is owned by EuroMTS, the International Securities Market Association (ISMA) and 11 major banks and securities houses.

Regulatory status

Coredeal MTS is an RIE under the FSMA 2000. The exchange has also been designated as a regulated market by the FSA for the purposes of the ISD.

Participation

Coredeal MTS admits members on the basis of them contracting to abide by the exchange's rules and guidance. There are two classes of member: clearing and non-clearing. Clearing members are also required to be a member of the central counterparty TradeGo. Non-clearing members are not required to be a member of TradeGo but must instead make arrangements with a clearing member to clear transactions on their behalf. As an RIE, Coredeal MTS monitors members' compliance with its rules and there is a clear disciplinary process should rule breaches occur. Access to the trading system for all members is strictly controlled and monitored.

Transactions handled

Coredeal MTS is an electronic exchange for benchmark corporate bond issues.

System operating procedures

Coredeal MTS operates on the Telematico platform that is used by all the MTS exchanges. It has become a quote-driven market with established market-maker obligations.

Clearing/settlement

All trades are executed on Coredeal MTS anonymously, after which settlement instructions are automatically generated from the Telematico system and sent to TradeGo (via Euroclear). Trades for non-clearing members are cleared in the name of the clearing member with whom the necessary arrangements have been made.

Outright cash trades on Telematico settle according to the prevailing market rule for the relevant instrument traded. Most eurobonds settle on a T+3 cycle in Euroclear.

Operating hours

Coredeal MTS operates from 7.15 am to 4.30 pm London time.

4.2.4 Jiway

Ownership and governance

The Jiway market is operated as a market of the OM London Exchange (OMLX), which is itself wholly owned by OM AB.

Regulatory status

The Jiway market started trading in November 2000. It now operates within the regulatory framework of the OMLX, which acquired RIE status from the FSA in 1999.

Participation

Jiway admits as trading parties regulated European brokers and other financial intermediaries.

Transactions handled

Jiway is designed to provide its members with transparent and convenient access to markets for which direct membership is commercially impracticable. It currently provides a single access point for trading, clearing, settlement and safekeeping for equities in eight exchanges in seven countries (as at September 2002) across Europe and the United States.

System operating procedures

Jiway ensures that execution of orders (currently up to a limit of EUR 50,000, as at September 2002) occurs with at least as good a price and volume as the best available on the appropriate local market. Jiway provides trading, clearing, settlement and safekeeping using OM's technology operations.

Clearing/settlement

All trades are executed against Jiway itself, which operates as the CCP.

Jiway provides a single access point for settlement of transactions across all of its markets. Trading parties can elect to use Jiway for safekeeping or to designate external settlement systems on a per-account basis.

Operating hours

Jiway gives access to trading each stock whilst that stock is open for trading on the underlying local exchange. The Jiway support desk is open during European and US trading hours.

4.3 Clearing**4.3.1 London Clearing House**

LCH acts as CCP to trades executed on LIFFE, the LME, the IPE and the London Stock Exchange (trades on the SETS electronic trading platform) and a limited number of contracts on the US-based Intercontinental Exchange.

Since 1999, LCH has acted as CCP for cash and repo trades in European (Austrian, Belgian, Dutch, German and UK currently, with more planned) government bonds, supranational and agency bonds and Jumbo Pfandbriefe ("Repoclear") and plain vanilla interest rate swaps ("Swapclear").

Ownership and governance

LCH is a public limited company. It is owned by its members (75% of the share capital) and LIFFE, the LME and the IPE (25% of the share capital in total).

Regulatory status

LCH is an RCH subject to supervision by the FSA under the FSMA 2000.

Financial resources

LCH assumes counterparty default risk when it accepts trades into clearing and covers that risk by requiring payment of margin. Initial margin (collateral), which is collected on all trades, is intended to protect LCH against the potential loss of a defaulter's positions before closeout. LCH also collects variation margin to re-establish this protection at close of business and, if necessary in fast-moving markets, makes intraday calls for more margin. LCH restricts, mainly to cash, government bonds and

bank guarantees, the types of collateral that it will accept as initial margin. Cash margin payments are received and made by LCH via the Protected Payments System, or PPS (see below).

Clearing members allocate business to house accounts (for the members' own trades, related companies and non-segregated customers, if any) and to customer accounts (for segregated customers, if they have any). The two accounts are maintained and margined independently.

In the event that a default by a clearing member leads to LCH incurring a loss greater than the defaulter's margin, LCH has the following financial resources at its disposal:

- up to GBP 10 million of LCH's current year's profits;
- a cash-based default fund (GBP 335 million as at August 2002), to which all LCH members contribute;
- GBP 200 million of insurance cover; and
- own funds of over GBP 50 million.

Credit and liquidity risk control measures

In addition to the above, LCH sets minimum capital requirements for members. Members also have to satisfy LCH regarding their ability to meet day-to-day operational requirements, including the adequacy of their back office and banking arrangements. Trading levels and patterns are monitored throughout the day.

Participation in LCH's Protected Payments System (PPS)

As mentioned above, margin payments are made via LCH's PPS. Every clearing member maintains an account, or accounts, with at least one participating bank and LCH maintains accounts with all participating banks. Routine margin calls are made on the morning of T+1 (intraday calls on T). Once a bank has confirmed to LCH that it will make the margin payment required on the member's behalf, it is irrevocably committed to do so. Payments are made by internal branch transfers between the accounts of the clearing members and LCH at each participating bank, with final cash settlement taking place by 10 am on T+1. Intraday margin calls must be confirmed within an hour using the same process.

Transaction processing environment

LCH is linked electronically to the exchanges for which it acts as a CCP. SWIFT messages are used to transmit details of margin requirements to members' PPS banks.

4.3.2 European Central Counterparty (EuroCCP)

With the introduction of Nasdaq Europe's Hybrid Market system, EuroCCP expects to act as CCP to all trades executed on the exchange. Users of Nasdaq Europe's central limit order book must be either a direct EuroCCP Participant or have an indirect clearing relationship through a EuroCCP General Clearing Participant. Participation in EuroCCP is voluntary for members who trade elsewhere and report those trades to Nasdaq Europe. EuroCCP offers a cross-border service clearing both European and US securities. Settlement of the trades cleared by EuroCCP takes place in the designated home CSD of the security. EuroCCP provides optional settlement netting and supports clearing and settlement in multiple currencies.

Ownership and governance

EuroCCP is a wholly owned subsidiary of the US-based Depository Trust & Clearing Corporation (DTCC) and is run on a not-for-profit basis. A Board that has a majority of representatives of the user community governs the company.

Regulatory status

EuroCCP is an RCH subject to the supervision of the FSA under the FSMA 2000.

Financial resources

EuroCCP assumes counterparty default risk when it accepts trades into clearing and it covers the risk by requiring its participants to deposit collateral. The Participants' current and projected trading volumes and other risk-related criteria are taken into consideration when the required collateral deposit is calculated.

At the end of the day, EuroCCP recalculates the requirement of each Participant and, at the opening of business the following day, each Participant will be advised whether it needs to increase its deposit. EuroCCP reserves the right, however, to require any Participant to increase its deposited collateral intraday, should its exposure change. The collateral requirement is calculated on net positions by currency and must be initially provided in the calculated currency in cash. Other forms of collateral are being evaluated.

Participants can allocate business to principal accounts (for the Participant's own trades, related companies and non-segregated customers, if any) and to agency accounts (for segregated customers, if any). The two sets of accounts are maintained and collateralised independently.

In the event that a default by a Participant leads to EuroCCP incurring a loss greater than the collateral deposited by the defaulter, EuroCCP has the following financial resources at its disposal:

- the Participant Fund collateral deposits of the defaulting Participant;
- EuroCCP's retained earnings (if any);
- EuroCCP's excess operating revenues (if any); and
- a pro rata assessment against Participant Fund collateral deposits of all other Participants.

In addition, EuroCCP is currently exploring insurance cover as an additional resource.

Credit and liquidity risk control measures

In addition to the above, EuroCCP sets minimum capital requirements for participation. These vary between Individual and General Clearing Participants. In evaluating Participants' creditworthiness, EuroCCP also reviews operational and financial capabilities.

Daily payment flows

Transactions settle in the designated home market of the security and the payments for settlement activity are made in the appropriate currency through the payment mechanisms associated with the relevant CSD or ICSD.

EuroCCP holds accounts with its bank, in each of the admitted trading currencies, for collection of collateral. Collateral payments are made via bank-to-bank funds transfers to and from EuroCCP's bank accounts. Whether in respect of overnight or intraday calls, collateral payments must be made in accordance with a time schedule set by EuroCCP.

Transaction processing environment

As soon as a trade is dealt, it is automatically routed by Nasdaq Europe to EuroCCP for processing.

Output is available in respect of trades received from Nasdaq Europe in real time or batch mode, dependent upon each Participant's communication preference.

ISO7775 and ISO15022 format messages are used to report trade status and netting results, and to instruct settlement. ISO7775 and ISO15022 format messages are also used to report collateral requirements to participants. Intraday collateral calls are made via e-mail, fax and telephone.

4.4 Securities settlement systems

4.4.1 CREST

Ownership and governance

CREST was inaugurated on 15 July 1996, and was originally owned and operated by a private sector company, CRESTCo, which itself was owned by a range of CREST users. Following completion of the merger with Euroclear in September 2002, CRESTCo became a wholly owned subsidiary of Euroclear Bank.

Regulatory status

The dematerialisation of equities and other corporate securities was made possible by regulations made under Section 207 of the Companies Act 1989 - the Uncertificated Securities Regulations (USRs) 1995. Those regulations were amended in June 2000 to permit the integration of UK government stock (gilts) into CREST. The USRs were re-enacted with modifications in November 2001 to allow the introduction of electronic transfer of title (see below).

CREST is subject to regulation by the FSA, both as an RCH under the FSMA 2000 and as the Operator of a relevant system under the 2001 USRs. The merger with Euroclear has not affected the regulatory status.

Participation

Membership is open to bodies corporate and individuals regardless of domicile or location (except as mentioned below). Its membership comprises most firms active in the UK and Irish equity markets and the gilt market (or their custodians), and a large number of individuals.

In CREST terminology, there is a distinction between “participants” and “users”. Participants are those who hold securities in CREST (“members”) or who provide payment services (“settlement banks”) or registration services (“registrars”). Users are those who communicate with CRESTCo on behalf of participants. CRESTCo requires users to locate their gateway computers (the secure equipment used for sending/receiving electronic messages to/from CREST) in the United Kingdom, Ireland, the Isle of Man or, with the prior consent of CRESTCo, another EU member state.

Most corporate members maintain and operate their own securities accounts in CREST (“direct members”). “Personal members” (mainly individuals) maintain accounts in their own name, but use the facilities of a user (a “sponsor”) to communicate with CREST. Sponsors are required to be authorised under the FSMA 2000. Non-members of CREST which are active participants in the equity or gilt markets typically hold their accounts with custodians or brokers who are direct members of the system, although individuals may choose to hold their securities outside the system altogether, in paper form.

Applicants must enter a contractual agreement with CREST and arrange a daylight credit limit for payments settlement with an approved settlement bank. CRESTCo may require participants and users incorporated or resident outside the United Kingdom to provide a legal opinion confirming the participant’s or user’s ability to be bound by the terms of the agreement executed by CRESTCo and the participant or user.

Transactions handled

CREST settles the purchase, sale, loan and repo of UK and Irish equities and UK government and corporate debt. Moreover, through its links to other settlement systems in Europe and the United States, members are able to hold foreign securities. But the regulations governing CREST (ie the USRs) permit only the holding of securities governed by English, Scottish and Northern Irish laws (under a multi-jurisdictional approach, securities governed by Irish, Jersey, Guernsey and Isle of Man laws are held pursuant to the laws of those jurisdictions).

Accordingly, a transferee of a foreign security receives a CREST Depository Interest (CDI), an English law instrument representing the holder’s proprietary interest in the underlying foreign security, which is held on his behalf in the issuer SSS by a special purpose CREST nominee. A deed poll executed by CREST Depository Limited (CDL) sets out the holder’s right against the CDL to the underlying securities. The CDI holder has legal title to the CDI and beneficially owns the underlying foreign

security. CREST has the capacity to settle in multiple currencies and currently provides for settlement against sterling, euros and US dollars.

Operation of the transfer system

CREST accepts transfer instructions only from those legally entitled to give them; this is either the actual or intended legal owner of the assets in question, or somebody who has exhibited what is in effect a power of attorney from that owner. The terms of the transfer must be confirmed by both the transferor and the transferee, who input independent instructions into CREST which are matched before proceeding to settlement. The settlement process is continuous between 6 am and 4.35 pm London time, with settlement against payment ceasing at 4.05 pm. The system remains open for input and matching of forward-dated transactions until 8 pm. These timings are under constant review.

Transaction processing environment

All communication between CREST and members must currently occur via one of the two competing accredited network providers - SWIFT or BT Syntegra. In 2001, CREST reviewed the requirements set for CREST networks to ensure that providers could take advantage of new network technologies. Further accredited network providers are now being introduced, the first of these being the London Stock Exchange in July 2002.

Settlement procedures

Since 26 November 2001, CREST has provided real-time DVP with settlement in central bank money and irrevocable electronic transfer of title for securities denominated in sterling and euros. The USRs 2001 established the CREST records as the register for dematerialised UK securities (the Operator register), such that at the point of settlement in CREST the transferee/buyer receives immediate and irrevocable direct legal title to the dematerialised securities. CREST is not responsible for other functions carried out by securities registrars, such as dividend payments and other corporate events; the USRs require such registrars to keep a record of the Operator register for such purposes.

Also at the point of settlement, the CREST payment, which discharges the buyer's obligation to the seller, is accompanied by a simultaneous real-time payment from the buyer's settlement bank to the seller's across settlement accounts at the Bank of England. As a result, the buyer is solely exposed to the risk on their chosen settlement bank; and intraday risks between the settlement banks are eliminated. Settlement banks maintain separate accounts for CREST and "clean" payments (ie those arising other than from CREST). Settlement banks will balance (by means of liquidity transfers) their available funds between these accounts throughout the day according to the demands arising in CREST or from clean payments. At the start of each CREST settlement cycle, the liquidity balance on each settlement bank's CREST settlement account is irrevocably earmarked for CREST settlement.

Once CREST has identified a set of transactions for which sellers have stock, buyers have cash or credit, and buyers' settlement banks have sufficient earmarked RTGS liquidity, these transactions will be settled with finality. Only transactions where both stock and cash/credit are known to be available will be assessed for RTGS liquidity. Where available liquidity is insufficient, uncovered transactions will be left to be reassessed in the next CREST settlement cycle. Once stock has been transferred with legal title, and members' cash/credit positions updated within CREST, the Bank is notified of the dispositions of the earmarked liquidity and the resultant interbank RTGS transfers processed. Remaining earmarked liquidity is then released and any queued liquidity transfers effected. The earmarking process can then begin again.

In July 2002, the CCP service for SETS trades was expanded to include the option of settlement netting. As a result of this enhancement, CREST users who opt for the service will have only one settlement instruction to settle in each line of stock as a result of a day's trading. Netting only applies to sufficiently similar contracts; and the settlement (with LCH, as CCP) takes place on T+3, as for non-netted SETS trades.

Credit and liquidity risk control measures

CREST settlement banks are bound by contract to settle debts incurred in the CREST system by their customers. The settlement banks provide their customers with intraday credit in CREST, limiting their exposure by setting up debit caps within the system; CREST itself provides no credit facilities. The debit cap represents the maximum debit position which a settlement bank is willing to assume for a

given customer and is a combination of unsecured credit and credit advanced in return for charge over securities held by their customer in CREST.

To help increase the supply of liquidity available to the settlement banks intraday, CRESTCo and the Bank of England have introduced self-collateralising repo arrangements whereby a purchasing CREST member may use eligible securities (specifically UK government bonds) in the course of settlement to generate intraday sterling liquidity for its settlement bank.

Pricing policies

CRESTCo sets prices to cover its costs, including the cost of capital. Users of the system have received rebates from CRESTCo in recent years.

4.4.2 The Central Moneymarkets Office (CMO)

Ownership and governance

Ownership of the CMO system was transferred from the Bank of England to CRESTCo in September 1999.

Regulatory status

With the transfer of ownership to CRESTCo, the CMO system is subject to the same regulatory coverage as CREST.

Participation

Membership is open to all London money market participants subject to arrangements being made with a settlement bank to make payments on their behalf. There are currently 31 members of the CMO, which are drawn from a wide range of UK and overseas institutions. Over 200 firms also participate indirectly in the CMO through agency arrangements with CMO members.

Before joining the CMO service, each prospective member must enter into contractual agreements similar to those described in the case of CREST. CMO members have a book-entry account in their own name and make arrangements for a settlement bank to make and receive payments on their behalf for instruments transferred from and to other direct members.

Transactions handled

The CMO provides safekeeping and settlement facilities for sterling- and euro-denominated Treasury bills, local authority bills, bank bills, trade bills, bank and building society CDs and commercial paper. All of these instruments are immobilised in the CMO depository (which is operated on CRESTCo's behalf by the Bank of England), except for CDs, which are dematerialised using a contractual structure. Settlement occurs in real time by means of book-entry transfer between accounts in the CMO system.

Operation of the transfer system

Processing is continuous between 8.30 am and 4.45 pm London time, with settlement against payment finishing at 4.15 pm. Delivery of instruments is effected in real time following positive acceptance by the taker of the settlement instruction input by the giver (provided that the giver has the designated instruments on his CMO account).

Transaction processing environment

All communication between CMO members and the CMO system is by means of secure authenticated and encrypted electronic messages carried by Cable and Wireless.

Settlement procedures

Where a transaction is carried out against payment, the transfer of instruments between members simultaneously generates an instruction to the taker's settlement bank to pay the agreed amount to the giver's settlement bank. All such instructions are transmitted to the settlement banks following the payment deadline. Payment instructions generated by the CMO are not assured and may, in

exceptional circumstances, be rejected by the paying member's settlement bank, although this has not happened to date. Reversal of such payments is effected by an adjustment to the final end-of-day settlement calculation, provided notice is given to the Bank of England by 5 pm London time on the day the payment is due to be made. Transfers of instruments cannot be reversed.

The final transfer of instruments and the generation of any corresponding payment instructions occur simultaneously in real time throughout the day. Transfer of funds only becomes final, however, once the net credits and debits of the settlement banks are applied to their RTGS accounts at the Bank of England.

Credit and liquidity risk control measures

Arrangements for the settlement of payment instructions received and given by a settlement bank are for the member and its settlement bank to determine. In the event that a settlement bank fails or refuses to meet a payment instruction, the associated transfer of instruments will not be reversed by the CMO, which has no role in any subsequent negotiations between the parties to the transaction. In September 2002, the government published a consultation document which included proposals (and supporting draft legislation) for the dematerialisation of Treasury bills and other money market instruments. This will allow the closure of the CMO and the settlement of money market instruments in CREST subject to CREST DVP arrangements. The aim is to close the CMO at end-2003.

4.5 The use of the securities infrastructure by the Bank of England

The Bank of England uses CREST and the CMO to settle its daily open market (monetary policy) operations and to hold the RTGS collateral provided by its market counterparties.

