Payment Systems Oversight Report 2007

February 2008 | Issue No. 4

BANK OF ENGLAND

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Executive summary

Payment systems are fundamental to the functioning of the economy. The 2007 *Oversight Report* summarises developments in the key UK payment systems over the past year and explains the focus of the Bank's work in this field. It also provides a summary of the key cross-system issues affecting UK payment systems and outlines priorities for future work.

The Bank's oversight activity aims to address systemic risks remaining in UK payment systems. The overall message in this year's *Oversight Report* is positive, with the main UK payment systems continuing to exhibit a high level of robustness against international standards. In particular, the high-value payment systems remain close to observing fully the internationally recognised Core Principles for Systemically Important Payment Systems.

During 2007 progress has been made in a number of areas, including:

- further initiatives across the overseen payment systems to strengthen resilience to major operational disruptions and to improve and test business continuity procedures;
- CHAPS members running a number of successful contingency tests, most notably, testing the use of faxed messages and members sending payments from secondary sites;
- the introduction of a new rule ('Rule 16') which publicly discloses all the criteria for CREST settlement bank access and ongoing participation. This strengthens observance of Core Principle IX to fully observed;
- CLS publishing a self-assessment against the Core Principles, a development in transparency that the Bank supports and welcomes;
- CLS improving the resilience of its operations by opening an out-of-region data centre and introducing an additional system to allow settlement to be completed in the event of its core system becoming unavailable;
- the implementation by Bacs and the Cheque and Credit Clearings of the *Cheque and Debit Recall Agreement* and the implementation by Bacs of the *Direct Debit Recall Agreement*;
- the implementation by the Cheque and Credit Clearing Company of the 'T plus 2-4-6' commitment which strengthens the Cheque and Credit Clearings' observance of Core Principle VIII to broadly observed;

- the migration of a number of LINK members to using reserve accounts in RTGS for settlement, which has helped to reduce settlement delays significantly; and

- the decision by SWIFT to implement a strategic re-architecture which should deliver gains in resilience through the addition of another operating centre.

These developments are described in the main body of the *Oversight Report*, along with the highlights of the Bank's assessments of the UK payment systems against the Core Principles.

As discussed in this and previous *Oversight Reports*, the Bank has developed a risk-based framework to guide its oversight activities — the 'Oversight Risk Framework'. This acts as a complementary tool to the Core Principles and helps the Bank make a consistent quantitative estimate of the importance of the risks across the various systems. The framework has been refined further during 2007. The Bank continues to encourage further progress by systems in implementing risk-mitigating initiatives where its assessment suggests improvement to be desirable and proportionate to the risk in question.

The structure of the 2007 *Oversight Report* is as follows. Chapter 1 discusses the Bank's role in the oversight of core UK payment systems, further developments in the Bank's risk-based framework for oversight, and payment systems' resilience during the recent market turbulence. Key developments in individual UK payment systems and summaries of the Bank's updated Core Principles assessments are presented in Chapter 2, and Chapter 3 focuses on cross-system thematic issues and priorities over the coming year. The Bank's detailed assessments of the individual systems against the Core Principles are contained in a separate document ('Detailed assessments of payment systems') available on the Bank's website (www.bankofengland.co.uk/publications/psor/psorannex2007.pdf).

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Chapter 1: An introduction to payment systems oversight

The *Payment Systems Oversight Report 2007* focuses on the key developments in the main UK payment systems during the year. An estimated total value of around £240 trillion passed through these systems in 2007 (**Table A**). The *Oversight Report* also outlines the risk mitigation issues considered by the Bank to be priorities over the coming year.

1.1 The role of central banks in the oversight of payment systems

The role of central banks in payment systems oversight was discussed in the first and second issues of the *Oversight Report*,(1) and in the Bank of England's Spring 2005 *Quarterly Bulletin*.(2) The Bank of England's oversight responsibilities in respect of payment systems are described in the 2006 Memorandum of Understanding (MoU) with HM Treasury and the Financial Services Authority (FSA).(3)

Under the MoU, the Bank is responsible for providing advice to the Chancellor regarding major problems arising within payment systems systemically significant to the United Kingdom. The MoU also states that the Bank is closely involved in developing and improving the infrastructure to help reduce systemic risk. However, as described in the Governor's Mansion House speech in June 2007, the Bank has no formal powers to discharge these responsibilities.(4) Instead the Bank seeks to convince the management and owners of payment systems of the rationale for risk-reducing changes where it assesses that the risks to the wider economy are not sufficiently addressed by the operators of payment systems and their participants. The Bank has a number of means for pursuing such issues, including through publications such as the *Oversight Report*.

These arrangements have worked effectively, as demonstrated by the significant progress across systems in implementing risk-reducing measures, described in this and previous *Oversight Reports*. However, there is a lack of clarity about the scope of the Bank's responsibilities in this area. Furthermore, there is a potential imbalance between the responsibilities associated with an oversight role and the ability of the Bank to deliver (without formal powers), particularly in relation to those systems where the Bank does not have a close operational involvement. The Bank, HM Treasury and the FSA believe it is now appropriate to establish a clear and robust framework for the oversight of payment systems which resolves these issues and is compatible with the Bank's core purposes of promoting monetary and financial stability.

Consultation on such a framework and the details of the regime to be implemented under it was launched by the Authorities in January 2008, as part of a wider consultation on reforms to the framework for financial stability and depositor protection.(5) As described in the consultation document, the Bank's responsibilities, and its operational role as a central bank, mean that the Bank will naturally continue to be closely involved in the design, management and operation of high-value wholesale interbank payment systems; and this provides considerable leverage to ensure that these systems function in a prudent and effective way. For wholly or largely retail systems, the oversight role may fit more comfortably with the FSA. The Government has proposed that it could assign oversight responsibilities to the appropriate authority, ensuring that the relevant authorities are properly equipped, where necessary, with suitable powers. The Bank believes that it is important that its oversight role is compatible with its two core purposes.

Comments on the proposals described in the consultation document are sought by 23 April 2008. The details of the oversight regime to be implemented will be the subject of further consultation.

1.2 A risk-based framework for oversight

As described in the second and third issues of the *Oversight Report*, the Bank has developed a risk-based approach to help direct its attention and resources to where the level of risk in payment systems is greatest. This approach is formalised within the Bank's Oversight Risk Framework. The Framework organises the various risks related to payment systems into

(1) Bank of England (2005), *Payment Systems Oversight Report 2004*, and Bank of England (2006), *Payment Systems Oversight Report 2005*, both available at www.bankofengland.co.uk/publications/psor/.
(2) Haldane, A and Latter, E (2005), 'The role of central banks in payment systems oversight', *Bank of England Quarterly Bulletin*, Spring, pages 66–71, available at www.bankofengland.co.uk/publications/quarterlybulletin/qb050106.pdf.
(3) *Memorandum of Understanding between HM Treasury, the Bank of England and the Financial Services Authority (2006)*, available at www.bankofengland.co.uk/financialstability/mou.pdf.
(4) The Governor's speech at the Mansion House, June 2007, available at www.bankofengland.co.uk/publications/speeches/2007/speech313.pdf.
(5) The consultation document *Financial stability and depositor protection: strengthening the framework* is available at www.bankofengland.co.uk/publications/other/financialstability/consultations.htm. The oversight of payment systems is discussed in detail from paragraph 3.28.

three distinct categories: settlement risk, operational risk and business risk. Risks are then assessed in terms of a quantification of the likelihood of a risk event occurring, and the range of potential impacts should an event occur. The Framework is used internally as a guide to setting oversight priorities with Bank senior management. Since the previous *Oversight Report*, the Bank has worked to refine its analysis of the likely impact of a risk once it has materialised, in particular through a more careful quantification of the resultant direct and indirect costs.

The Oversight Risk Framework complements the Committee on Payment and Settlement Systems' Core Principles for Systemically Important Payment Systems.(1) **Table B** summarises the Bank's assessment of the UK systems against the Core Principles; the detailed assessments are available on the Bank's website.(2)

The Bank expects payment systems' degree of observance of the Core Principles to be proportionate to the systemic importance of the system in question, while being mindful of the associated costs. In some cases, the Bank's risk-based approach may indicate that a system should endeavour to implement risk-reducing measures beyond those implied by full observance of the Core Principles. For some other systems, full observance of each of the Core Principles may not be deemed proportionate or necessary relative to the risks arising in the system. In particular, although there are a number of Core Principles which all systems should meet, there are others which are perhaps less critical for particular systems.

The Core Principles are an important example of an established international standard widely adopted by central banks for payment systems oversight. The benefits from such widespread application, in particular with regard to transparency, are noted in Chapter 3. This was also one of the themes discussed at the joint ECB – Bank of England conference *Payments and monetary and financial stability*, which took place in November 2007. (3)

1.3 System resilience during market turbulence

The period of market turbulence since Summer 2007 has been associated with very high — in some cases record — volumes of transactions processed by payment systems. Systems have generally coped well with this level of activity, and where problems have occurred, these have typically been dealt with effectively and caused limited impact.(4)

However, the market turbulence did highlight some areas for further attention, in particular in relation to contingency planning and in ensuring adequate processing capacity, including by members of the systems. These issues are discussed in greater detail in Chapter 3.

(1) The full text of the Core Principles is available at www.bis.org/publ/cpss43.htm.
(2) See www.bankofengland.co.uk/publications/psor/.
(3) The conference proceedings are available at: www.bankofengland.co.uk/publications/events/fsconfnov07/index.htm
(4) As described in Bank of England (2007), Financial Stability Report, *October*, available at www.bankofengland.co.uk/publications/fsr/2007/index.htm.

Table A Volumes, values and main payment types (daily averages)[(a)]

	Volume	Value (£ millions)[(b)]	Important payment types	Most likely short-term substitutes
PAYMENT SYSTEMS				
CHAPS			• Settlement of financial market transactions	• CHAPS Sterling bypass mode
Sterling	140,624	268,272	• CLS pay-ins and pay-outs	• Manual procedures for making a small number of payments
Euro[(c)]	31,145	223,867	• House purchases	• Possible use of correspondent banking arrangements for some other payments
			• Other time-critical payments	
Bacs	21,949,503	14,643	• Salary and benefit payments • Bill payments by Direct Debit • Telephone and internet banking	• Perhaps limited scope for switching to other instruments in the short term — eg cheques or cash
C&CC[(d)]	4,828,793	4,812	• Payments for goods and services by consumers and businesses • Bill payments and small financial transactions (eg payments into savings accounts) • Person-to-person payments	• Bacs • Card networks • Cash
Visa (credit and debit cards)[(e)]	14,347,945	832	• Payments for goods and services by consumers and businesses	• Cheques • Other card networks • Cash
MasterCard[(f)] (credit and debit cards)[(e)]	9,890,411	526	• Payments for goods and services by consumers and businesses	• Cheques • Other card networks • Cash
LINK	7,526,027	296	• Withdrawal of cash using an ATM not operated by the customer's own bank	• Own bank's ATMs • Other cash withdrawal channels
CREST (payment arrangements supporting CREST)[(g)]				
Sterling		416,815	• Settlement of gilts, equities and money market instruments (including in respect of OMOs and repo market transactions more generally)	• Increased free-of-payment transfers could be accommodated within CREST but with increased principal risk
US dollar		6,393		
Euro		1,499		
Total CREST	314,802	424,707		
LCH.Clearnet Ltd (Protected Payment System)[(h)]				
Sterling	187	877	• Settlement in respect of cash margin payments	• If disruption does not prevent calculation of settlement obligations, contingency payment procedures may be invoked
US dollar	198	1,215	• Payments for commodity deliveries	
Euro	139	703	• Cash settlements	
Other	305	160	• Default fund contributions	• Contingency algorithms can be used to calculate obligations if usual mechanisms are unavailable
Total LCH	829	2,955		
Foreign exchange settlement system				
CLS[(i)]			• Settlement of foreign exchange trades	• Correspondent banking arrangements in the relevant countries but with increased principal risk
All currencies	174,247	897,743		
Sterling[(j)]	29,773	144,289		

Sources: APACS, Bank of England, CLS Bank International, Euroclear UK & Ireland Ltd, LCH.Clearnet Ltd, LINK Interchange Network Ltd.

(a) Except where indicated.
(b) US dollar, euro and 'other' figures are shown as sterling equivalent.
(c) Comprises domestic and cross-border euro payments (including both inward to and outward from the United Kingdom).
(d) Volumes and values include items drawn on other banks only.
(e) Figures for 2006 are shown.
(f) Includes UK Maestro and Solo transactions.
(g) Value figures refer to cash movements within CREST (and will therefore include the value of transactions settled between CREST members who use the same settlement bank). The daily average volume figure refers to all transactions processed with CREST, of which not all involve cash movements.
(h) Figures for the LCH.Clearnet Ltd Protected Payment System (PPS) refer to the sum of all (net) payments between LCH.Clearnet Ltd and its members through the PPS. Volume figures are for the period 21 January 2008 to 1 February 2008.
(i) Each transaction has two 'sides'. Only one side is counted in the volume and value figures.
(j) Trades in which one leg is denominated in sterling.

Table B Summary assessment of the main UK payment systems against the Core Principles

Observed
Broadly observed
Partly observed
Not observed
Not applicable
Under review
Not rated
2006 rating

Core Principles	CHAPS £ & €	CREST £ & €	CREST US$	LCH. Clearnet Ltd PPS £ & €[(a)]	LCH. Clearnet Ltd PPS US$[(a)]	Bacs	C&CC	LINK	UK Maestro
I Legal basis	Observed	Observed	Broadly observed	Observed	Observed	Observed	Partly observed	Broadly observed	Partly observed
II Understanding financial risks	Observed	Observed	Observed	Observed	Observed	Observed	Observed	Observed	Broadly observed
III Management of financial risks	Observed	Observed	Partly observed	Broadly observed	Broadly observed	Broadly observed	Broadly observed	Broadly observed	Broadly observed
IV Prompt final settlement	Observed	Observed	Partly observed	Observed	Observed	Observed	Observed	Broadly observed	Not rated
V Settlement in multilateral netting systems	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Broadly observed	Broadly observed	Observed	Observed
VI Settlement asset	Observed	Observed	Partly observed	Observed	Partly observed	Observed	Observed	Observed	Broadly observed
VII Security and operational reliability	Observed	Broadly observed	Broadly observed	Observed	Observed	Broadly observed	Broadly observed	Observed	Observed
VIII Efficiency	Observed	Observed	Observed	Observed	Observed	Partly observed	Broadly observed (2006: Partly observed)	Observed	Observed
IX Access criteria	Broadly observed	Observed (2006: Partly observed)	Observed (2006: Partly observed)	Observed	Observed	Broadly observed	Broadly observed	Observed	Broadly observed
X Governance	Broadly observed	Partly observed	Partly observed	Observed	Observed	Broadly observed	Broadly observed	Observed	Broadly observed

(a) The LCH.Clearnet Ltd Protected Payments System (PPS) enables settlement of obligations between LCH.Clearnet Ltd and its members in 15 currencies. The assessment shown in **Table B** relates to the three main currencies settled, namely sterling, euro and US dollar.

Chapter 2: Key developments in the main UK payment systems

This chapter discusses the main developments in individual payment systems during 2007. It draws on updated Core Principles assessments, which are available on the Bank's website. **Table B** summarises the assessments for CHAPS, the payment systems supporting CREST and LCH.Clearnet Ltd, Bacs, the Cheque and Credit Clearings, the LINK (ATM) network and the UK Maestro card system. This chapter also reviews the main developments in CLS and SWIFT — two international infrastructures for which the Bank is part of a co-operative oversight process — and discusses the risks associated with the main UK debit and credit card systems.

As in previous *Oversight Reports*, the overall messages are encouraging: high standards are being maintained across the UK payment systems. During 2007, there have been a number of incidents across systems, including operational disruption affecting CHAPS, CREST, Bacs, CLS and SWIFT, as described in the following sections. However, in each case the problems were dealt with effectively, and normal operations were resumed quickly, preventing wider market impact.

There are fewer changes in the Core Principles assessments in this *Oversight Report* compared with previous years. This reflects the progress already made in implementing risk-reducing initiatives, as well as the time needed to identify and implement proportionate responses to some of the remaining risks. During 2007, there have been a number of actions taken that result in the most systemically important systems achieving levels of robustness in excess of those required by the Core Principles, but in proportion to their importance to the financial system.

There remain some areas where further risk-reducing measures could usefully be undertaken by the operators of UK payment systems. This chapter highlights the main areas where further improvements may be warranted.

2.1 CHAPS

CHAPS is the United Kingdom's high-value payment system, providing Real-Time Gross Settlement (RTGS) of credit transfers. It consists of two systems: CHAPS Sterling and CHAPS Euro, providing settlement for sterling and euro respectively, although CHAPS Euro will close from May 2008 when the final phase of TARGET2 goes live (see Section 2.2). Provision of RTGS infrastructure is outsourced by CHAPS members to the Bank of England. That relationship is governed by a Memorandum of Understanding between the Bank and the CHAPS Clearing Company Ltd (CHAPSCo).

There are 15 CHAPS Sterling members and 13 CHAPS Euro members (excluding the Bank). During 2007, UBS joined CHAPS Sterling on 8 October, JP Morgan Chase left CHAPS Euro on 1 June, while Barclays, Royal Bank of Scotland, Citigroup and Bank of Tokyo-Mitsubishi all left on 19 November when TARGET2 went live.

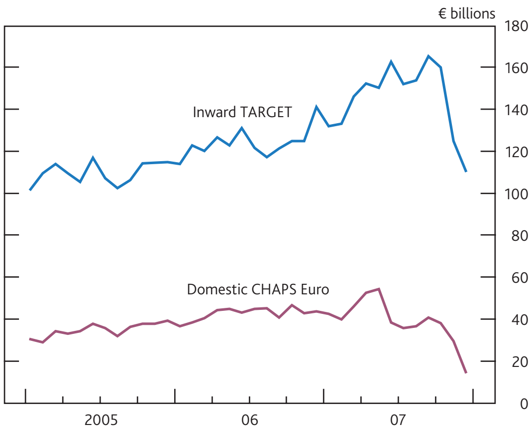
As seen in **Chart 1**, values of CHAPS Sterling payments increased through 2007, while volumes, having increased at the start of the year, remained broadly flat from March. Looking forward, it is expected that CHAPS volumes will decrease as many lower value CHAPS payments are re-routed to the forthcoming Faster Payments service.

Chart 1 Average daily volume and value of payments processed in CHAPS Sterling

Source: Bank of England.

Chart 2 shows that both CHAPS Euro and inward TARGET payments decreased sharply in the last quarter of the year. This was due to the first wave of countries joining the new TARGET2 system (described in Section 2.2). Even though CHAPS Euro is not due to close until 16 May 2008, as noted above, several large CHAPS banks left CHAPS Euro to become part of TARGET2, either through correspondent banks in countries in the new system, or through their own branches in those countries.

Chart 2 Average daily value of CHAPS Euro payments and payments sent to the United Kingdom via TARGET[(a)]



Source: Bank of England.

(a) The value of payments sent to the United Kingdom via TARGET is approximately equal to the value of payments sent out of the United Kingdom via TARGET.

The daily value of CHAPS Sterling payments represents around 20%–25% of annual UK GDP. This, combined with the critical role CHAPS payments play in distributing liquidity in the UK financial system and the fact that RTGS provides final settlement for the other main payment systems in the United Kingdom, means that the Bank attaches particular importance to the mitigation of risks within CHAPS and the related RTGS infrastructure.

The previous *Oversight Report* assessed CHAPS to observe fully seven Core Principles and broadly to observe the remaining two which applied. The Bank has not changed this view for this year's assessment. In the 2006 *Oversight Report*, the Bank noted that the assessment against Core Principle X might be reviewed in light of changes in the governance of UK payment systems following the introduction of the Payments Council which has the authority to influence the governance of CHAPS strategically. Since the Payments Council's overall strategic direction in relation to wholesale payments is still under discussion, the Bank's current assessment of Principle X remains unchanged as broadly observed.

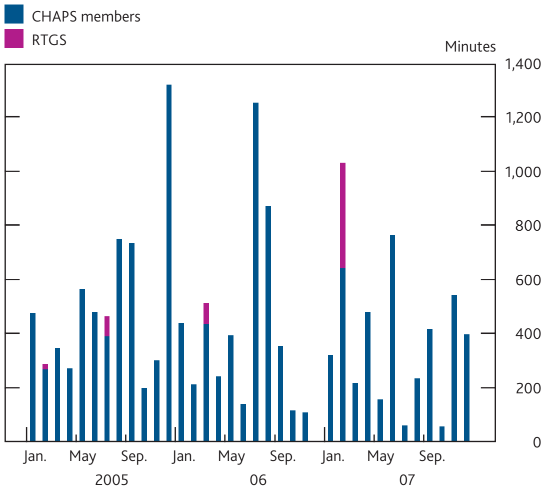
The Bank plans to review the provision of the RTGS service. It intends to consult interested parties in due course.

Operational risk (Core Principle VII)

CHAPS remains an inherently robust payment system, commensurate with its systemic significance. CHAPS operates on a RTGS basis, eliminating credit risk, and because CHAPS member banks rely on the RTGS infrastructure to manage their liquidity on a continuous basis, this brings the management of operational risks to the fore, both within the infrastructure and at a member level.

The aggregate duration of member and RTGS outages each month is shown in **Chart 3**. Average member outages fell from 28.9 minutes per month in 2006 to 22.8 minutes in 2007. There were variations among members in performance over the course of 2007, with the best performing member being available 99.99% of the time for the year to December 2007 compared with the worst at 99.24%.[(1)] The CHAPS Board monitors members' operational performance and has a mechanism to take appropriate action where necessary.

Chart 3 Monthly downtime of RTGS and CHAPS Sterling members



Sources: Bank of England and CHAPSCo.

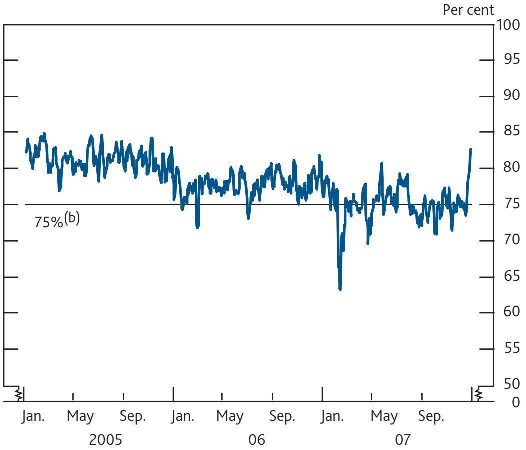
Chart 3 also shows that the central RTGS infrastructure was generally reliable in 2007 with high availability, apart from one significant incident on 12 February. As reported in the 2006 *Oversight Report*, connectivity problems on that day affected the RTGS infrastructure, preventing CHAPS members from submitting settlement instructions to RTGS via SWIFT for around six hours. This was caused by localised problems affecting the software supporting RTGS, rather than the wider SWIFT network. The impact of the outage was mitigated by successful operation of contingency arrangements for certain payments before connectivity was restored. Following restoration of RTGS' SWIFT connection, all outstanding payments were settled on the intended day. Actions to prevent future events such as these have been implemented, including improving operational procedures and the maintenance of the software involved.

Members continued to have difficulty meeting the CHAPS throughput guidelines (50% of payments by value to be made by 12:00; 75% by 14:30) as shown in **Chart 4**. This trend has continued from 2005 and seems to reflect structural shifts in the values of payments made from earlier to later in the day, rather than any hoarding of liquidity on the part of members: in all but a very few cases, the members concerned had the requisite liquidity to make these payments. Various

(1) **Chart 3** does not include UBS as it was a member of CHAPS Sterling for only two full months in 2007.

possible reasons for this decline in the share of payments instructions earlier in the day have been explored, but none has so far provided a clear explanation. The Bank still believes that throughput guidelines are an important part of risk mitigation in the system, but will be working with CHAPS to consider the appropriateness of the current guidelines in the coming months.

Chart 4 Average percentage of sterling payments sent by CHAPS members by 14:30[(a)]



Source: Bank of England.

(a) Five-day moving average.
(b) CHAPS throughput guideline at 14:30.

Business continuity planning (Core Principle VII)

As noted in the 2006 *Oversight Report*, the mitigation of the most immediate operational risks to CHAPS means that a greater focus is on low likelihood but high impact risks such as terrorist events, pandemic flu or electronic attacks. The Bank has therefore been encouraging CHAPS and its members to undertake more demanding business continuity tests over the course of the year.

One scenario which would impact on most CHAPS members is a major operational disruption in the City of London or Canary Wharf which would mean many firms moving to back-up sites simultaneously. Therefore, on 16 October 2007, all CHAPS members operated their payment processing functions from these secondary sites in a co-ordinated test. No major issues were reported and the performance of CHAPS was unaffected. The Bank will continue to encourage and promote more challenging tests in future.

In common with a number of systems, CHAPS has a very high degree of dependency on SWIFT for its normal operation since all payment messages to the central processor are sent and received via the SWIFT network. If SWIFT is unavailable for a considerable period of time, the more critical CHAPS messages can be effected via faxes to the Bank's RTGS Account Controllers who would make these payments within the system, although the number of payments that can be made in this way is considerably lower than in normal running.

A test of the ability of members and RTGS Controllers to operate this contingency process took place on 11 September 2007. The result was broadly positive and the majority of the faxed payments were able to be processed within the target deadline of 20 minutes. Some payments, however, took longer, largely due to authentication problems which have been investigated. The exercise was useful and further such tests are being planned.

Work is under way to consider other contingency methods, such as re-routing of payments via Bacs, although there are constraints in such re-routing, as discussed in Section 3.2.

Liquidity and settlement risk (Core Principles III, V and IX)

As highlighted in previous *Oversight Reports*, an outage of RTGS which leads to RTGS bypass mode being invoked — where settlement takes place at the end of the day on a multilateral net settlement basis — is the only circumstance in which credit risk is present in CHAPS. Given the size of the transactions in CHAPS, it is likely that large credit exposures would be built up between counterparties during the day. The Bank, in conjunction with CHAPSCo, has therefore been analysing the reduction in risk which might be achieved by introducing an extra settlement cycle into CHAPS contingency procedures on a day when the system is running in bypass mode. This work suggests that settlement risk could be reduced significantly by including an extra cycle between 11:30 and 13:00. The Bank is currently assessing the potential benefits of such a measure with CHAPSCo and believes that this would provide an important enhancement to the contingency procedures.

Faster Payments

The background to, and the objectives of, the new Faster Payments service were discussed in the 2006 *Oversight Report*.[(1)] The target delivery date for the project was originally the second half of 2007 but this has now been postponed until May 2008.

Once Faster Payments becomes operational, responsibility for the management of the system will be assumed by CHAPSCo. CHAPSCo have agreed the interaction between CHAPS and Faster Payments members in the voting structure for Board meetings. A more formal oversight role for Faster Payments will be adopted by the authorities in the future if the system becomes sufficiently systemic.

2.2 TARGET

On 19 November 2007, the new TARGET2 (Trans-European Automated Real-Time Gross settlement Express Transfer)[(2)]

(1) Bank of England (2006), *Payment Systems Oversight Report*, available at www.bankofengland.co.uk/publications/psor/.
(2) For further information, see www.ecb.int/paym/target/target2/html/target2launch.en.html.

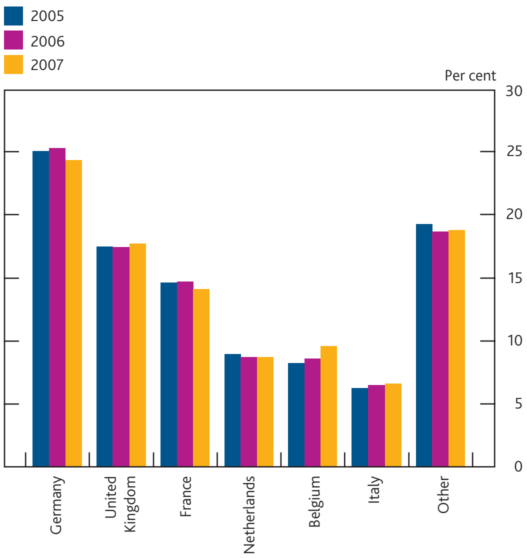
system went live with the first wave of countries (Austria, Germany, Cyprus, Latvia, Lithuania, Luxembourg, Malta and Slovenia) migrating. The new system consists of a single shared platform on which sit the TARGET systems of each member country. It replaces the original TARGET system which is effectively a network of national euro RTGS components, including CHAPS Euro.

A further wave of migration took place on 18 February 2008 and the final migration date is 18 May 2008. The Bank of England has decided that the UK RTGS system will not participate in TARGET2, so CHAPS Euro will close on 16 May 2008. After this date, CHAPS Euro members and their customers will effect TARGET payments in euro via another country's system, whether as direct members or customers of another member. Many CHAPS Euro members have already become members in this way and are running CHAPS Euro in parallel with their new membership of TARGET2. The Bank also has own account and customer business in euro, and it will access TARGET2 via De Nederlandsche Bank (DNB) to make and receive euro payments.

Even though the 'operational bridge' between RTGS and TARGET will be closed on 16 May 2008, a 'liquidity bridge' will remain. This will allow CHAPS Sterling members to transfer euro payments between their TARGET2 accounts and their CHAPS member balance group account, to enable euro cash to act as collateral for the provision of sterling intraday liquidity.

The United Kingdom marginally increased its share of cross-border TARGET payments during 2007, remaining the second biggest country by this measure after Germany, as shown in **Chart 5**.(1)

Chart 5 Share of cross-border TARGET payments by component(a)



Source: European Central Bank.

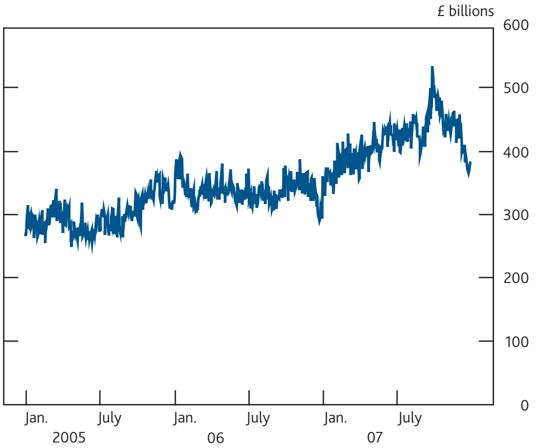
(a) Value of outward cross-border TARGET payments, January 2007 to October 2007.

2.3 CREST

CREST is the United Kingdom's securities settlement system, providing a delivery versus payment (DvP) settlement service for gilts, equities and money market instruments. The system is operated by Euroclear UK & Ireland Ltd (EUI),(2) a wholly-owned subsidiary of Euroclear SA/NV (ESA). EUI is incorporated in the United Kingdom and is regulated by the FSA as a Recognised Clearing House under the Financial Services and Markets Act 2000. The Bank has responsibility for oversight of the payment arrangements supporting CREST settlement.

CREST provides RTGS in central bank money for transactions in sterling and euro. **Chart 6** shows the daily value of sterling DvP transactions. Values averaged over £410 billion per day in 2007 — an increase of over 20% on the previous year. The high volumes of trading seen during the period of market turbulence (see Section 3.1) contributed to peak settlement values in the second half of the year, though values fell back to more normal levels towards the year end. CREST sterling settlement values remain larger than those processed in any other payment system overseen by the Bank.(3) In comparison, euro values remain small, averaging only €2.2 billion per day (£1.5 billion sterling equivalent).

Chart 6 Daily value of sterling DvP transactions in CREST



Source: Euroclear UK & Ireland.

CREST also provides for transactions to be settled in US dollars. In 2007, US dollar settlement values averaged approximately US$12.8 billion per day (£6.4 billion sterling equivalent).

(1) Since the chart excludes data from November and December 2007, the period during which migration to TARGET2 commenced, the United Kingdom's percentage share will be less than this for the year as a whole.
(2) Formerly CRESTCo Ltd.
(3) This figure does not include liquidity flows generated by the Self-Collateralising Repo mechanism. This mechanism enables settlement banks to use certain categories of eligible security as collateral for raising additional central bank liquidity on the platform.

Overall, the Bank assesses CREST's sterling and euro payment arrangements to observe fully seven of the nine relevant Core Principles and the US dollar payment arrangements to observe fully three.

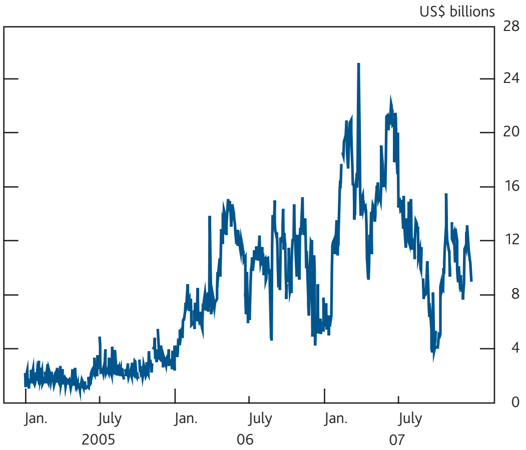
In this *Oversight Report*, the Bank has changed its assessment of CREST's observance of Core Principle IX from partly to fully observed due to the publication by EUI of a new rule which publicly discloses settlement bank access criteria.

Following a series of operational problems directly or indirectly related to a major system implementation (the Single Settlement Engine (SSE)), the previous *Oversight Report* assessed CREST's sterling, euro and US dollar payment arrangements only broadly to observe Core Principle VII. While improving in recent months, operational performance has continued to be of concern, with six major[1] and many smaller outages in 2007. Hence the Bank has not changed its assessment in this *Oversight Report*.

Settlement risk (Core Principles II, III, IV and VI)

US dollar settlement values continued to increase further over the past twelve months (**Chart 7**). As noted above, average values were over US$12.8 billion per day in 2007, though this rose to over US$20 billion on peak days.

Chart 7 Daily value of US dollar DvP transactions in CREST



Source: Euroclear UK & Ireland.

Although these values are small relative to those for sterling settlement, they are still significant and the payment arrangements supporting US dollars are less robust than those for sterling (and euro) settlement. Interbank obligations arising from CREST US dollar transactions are settled on an end-of-US day bilateral net basis, through settlement banks' correspondents in the United States.

The 2006 *Oversight Report* detailed the way in which CREST US dollar settlement arrangements create significant intraday exposures for settlement banks and members. As values have risen, the Bank estimates that total maximum exposures to some settlement banks are commonly over US$2 billion, and sometimes exceed US$4 billion.

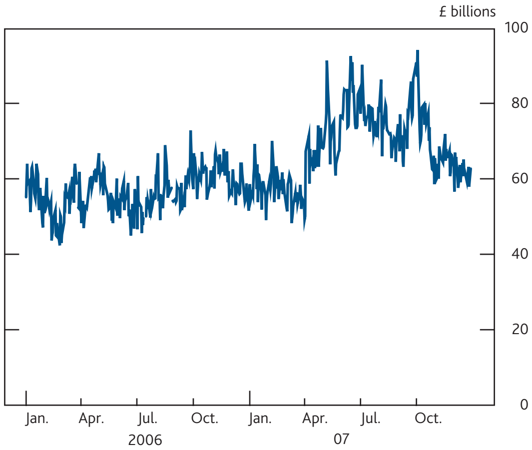
In October 2006, CRESTCo (now EUI) established a working group to consider how these risks could be significantly and permanently reduced. The group concluded that the type of risk mitigation measures used in other systems were either disproportionate to the risks involved or would not significantly reduce the largest exposures. It is however important that settlement banks and CREST members understand these risks and have in place the appropriate systems and controls to manage them. During 2008, the FSA will be raising this issue with major participants in the CREST US dollar settlement arrangements as part of its ongoing supervisory relationship with these firms.

In light of these risks, the Bank assesses CREST's US dollar settlement arrangements partly to observe Core Principles III, IV and VI. The Bank will continue to monitor US dollar settlement values and associated exposures. If there is evidence from the FSA's discussions of weaknesses in firms' management of these risks, the Authorities may seek further risk mitigation.

Tiering and 'on us' settlement

Previous *Oversight Reports* have highlighted the risks arising from the highly tiered structure of the payment arrangements supporting CREST sterling settlement (cash settlement is provided by 14 settlement banks[2] to over 2,600 corporate institutions and over 42,000 personal members). Over the past year, there was a significant increase in the value of 'on us' settlement (**Chart 8**) — that is, transactions between members using the same settlement bank, though this started

Chart 8 Value of 'on us' sterling DvP transactions in CREST



Sources: Bank of England and Euroclear UK & Ireland.

(1) Defined as lasting over one hour for sterling settlement. This figure only includes outages caused by operational problems with the EUI-owned CREST system.
(2) Not all settlement banks provide settlement in all three currencies.

to fall back later in the year. However, the ratio of transactions in the CREST embedded payments system to internal CREST transactions has remained roughly constant since 2005. Due to the risks associated with a tiered payments arrangement, the Bank will continue to monitor these trends and investigate the underlying causes (see also Section 3.1).

Delivery by Value transactions (DBVs)

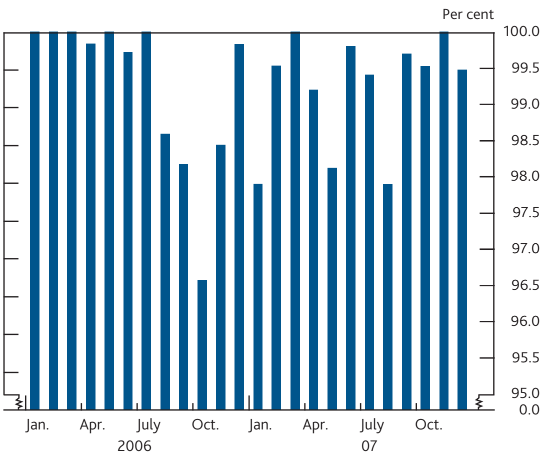
The Delivery by Value (DBV) mechanism allows CREST members to borrow or lend cash overnight against a package of securities. The securities are automatically selected and delivered during a dedicated window at the end of the day (from 15:00 onwards) and unwound first thing the following morning in Delivery by Value Returns (DBRs). CREST sterling settlement values are dominated by the flows arising from this mechanism. Together DBVs and DBRs typically account for around 70% of CREST values — over £290 billion per day. The size and concentration of DBV transactions in CREST gives rise to significant liquidity and operational risks to the market.

The high values currently settling through DBVs arise in part because DBVs are used in CREST as a means of settling both overnight and term transactions. However, the use of the DBV mechanism to settle term transactions may introduce risk since term transactions settled via DBV have to be unwound and recreated at the start of each day of their term. A DBV-like term product would help to reduce risk to the financial system as well as meet the needs of CREST users.

Operational risk (Core Principle VII)

Reflecting the operational problems which followed the SSE launch in 2006, the Bank downgraded its assessment of CREST against Core Principle VII (from fully to broadly observed) in the previous *Oversight Report*. Operational problems continued into 2007 (**Chart 9**). Between January and June, there were a total of 19 outages, cumulatively lasting over 11 hours.

Chart 9 CREST system availability for settlement



Source: Euroclear UK & Ireland.

Following the implementation of a number of software fixes in June 2007, system availability improved, but there have been further outages in the latter half of 2007, cumulatively lasting over six hours. Some of these outages necessitated significant extensions to the CREST settlement day (which caused extensions to the CHAPS settlement day). Two recent outages were caused by manual errors.

There was also an RTGS operational incident on 29 August 2007 which was not caused by the CREST system but which affected the connection to CREST. CREST and RTGS communicate by sending coded messages every few seconds. On the afternoon of 29 August, RTGS generated a message containing an error which caused the link between the two systems to go down. This caused CREST, with the Bank's agreement, to move to 'recycle mode', in which it recycles central bank liquidity for trade settlement rather than updating RTGS frequently with settlement positions. The hardware in the RTGS system which generated the error has now been replaced and no further problems have occurred since that date.

As described in the 2006 *Oversight Report*, ESA prepared a detailed Post Implementation Review following the SSE launch, drawing together the lessons learnt from the problems in CREST and detailing a number of risk-mitigating actions. The majority of these actions have now been completed including improving the testing environment and releasing software updates to rectify problems. Planning of other major programmes has reflected the lessons arising from the SSE launch and there has been evidence of a more controlled approach to implementing software fixes as well as improved communication with stakeholders and clients. While these improvements are welcome, it will only really be possible to judge whether the underlying weaknesses in change management have been addressed after full implementation of the related action plan and the launch of other major programmes.

Together with the FSA and the Belgian authorities (who lead the co-operative oversight of the Euroclear group), the Bank continues to follow up these operational problems with EUI and ESA. Both are taking these incidents seriously, and acknowledge that the prevention of further significant operational problems is a key priority. ESA has an action plan to restore system stability, through software releases to address identified problems and significant improvements to the testing and launch environment. These actions will be implemented during 2008.

Reflecting the operational problems in 2007, the Bank continues to assess CREST broadly to observe Core Principle VII.

Business continuity planning

As part of Euroclear's Data Centre Strategy, CREST's systems successfully migrated to two new data centres in Continental Europe in 2007. Euroclear Bank, Euroclear France and Euroclear Netherlands migrated to these data centres in 2006. CREST's migration reduces the risk of an incident at the primary data centre also impacting business at the back-up site because of the greater geographical distance between the two new sites.

Access criteria (Core Principle IX)

Over the past two years, EUI has been working with the CREST settlement bank community to ensure that all criteria which apply to settlement bank access (and ongoing participation) are publicly disclosed. A new rule ('Rule 16') was published in January 2008. The rule draws together EUI's own participation criteria, the Bank's policy on the provision of CREST settlement accounts and criteria specified by the existing settlement banks. It also details orderly exit procedures in the event that an existing settlement bank were to fall below the specified requirements.

The criteria are focused on aspects important to the continued smooth functioning of the payment arrangements supporting CREST settlement and the Bank considers them to be suitable for controlling the risks that arise in the system. The settlement banks have sought legal advice to ensure that the specified criteria are objective and fair. Completion of work in this area strengthens observance of Core Principle IX to fully observed.

Governance (Core Principle X)

Previous *Oversight Reports* highlighted shortcomings in the governance of the interbank settlement arrangements supporting CREST settlement. The operational problems following the SSE launch underlined the need to consider the form and quality of EUI's interaction with the settlement banks, both when CREST is operating as normal, and in the management of operational incidents. In particular, ESA's SSE Post Implementation Review highlighted the need for better interaction between ESA and EUI management.

To improve EUI's interaction with settlement banks, a new Settlement Bank Committee was established in February 2007. This Committee, which meets at least four times a year, is designed to act as a dedicated forum for discussion of issues relating to the interbank payment arrangements supporting CREST settlement. During 2007, the Committee has discussed a wide range of issues, including forthcoming system changes, incident and pre-launch communication, and the procedures to be used in the event of an end-of-day disruption. Experience of the August 2007 outages suggests that communication between EUI and the settlement banks has improved, in part due to the work of the Committee.

The Bank welcomes this regular interaction between settlement banks and EUI and encourages settlement banks to continue their active engagement in this process.

The 2006 *Oversight Report* also noted the weaknesses in change management revealed by the operational problems following the SSE launch. The Bank has met with EUI senior management to discuss the actions designed to address issues highlighted in the Post Implementation Review. Some of these actions have already been implemented and others, for example improvements to change, configuration and release management are scheduled for 2008. The Bank expects to see the effectiveness of these changes demonstrated in sustained improvements in system availability in 2008. Consequently, the Bank's Core Principle X assessment of the sterling, euro and US dollar payment arrangements remains partly observed.

Euro Settlement

The Central Bank and Financial Services Authority of Ireland (CBFSAI) will take over provision of euro-denominated payments from April 2008 (following the launch of TARGET2 in which the Bank is not participating, see Section 2.2). The arrangements, which will cover the period between the launch of TARGET2 and the introduction of the settlement phase of Euroclear's Single Platform, adapt CREST's existing 'recycle mode' procedures. The Bank is working with the CBFSAI and EUI to ensure a smooth transition to these new arrangements.

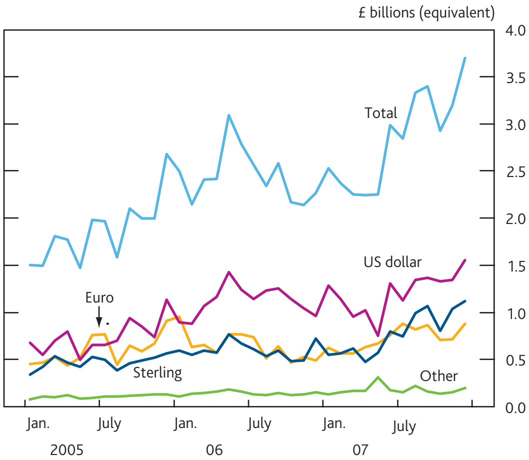
2.4 LCH.Clearnet Ltd

LCH.Clearnet Ltd is the main central counterparty (CCP) in the United Kingdom. It is incorporated in the United Kingdom as a private limited company, and is regulated by the FSA as a Recognised Clearing House under the Financial Services and Markets Act 2000. The Bank oversees LCH.Clearnet Ltd's operation of its embedded payment arrangements, the Protected Payment System (PPS).

LCH.Clearnet Ltd transfers margin and other cash to and from its members through the PPS. A network of commercial banks, known as PPS banks, provide accounts to both LCH.Clearnet Ltd and its members in one or more of the currencies in which liabilities are incurred.

Chart 10 shows the average value of payments made between LCH.Clearnet Ltd and its members through the thirteen UK PPS banks. While the amounts are small in comparison with those made through some other systems overseen by the Bank, the flows are primarily margin, and so reflect only a small percentage of the underlying value of the contracts that LCH.Clearnet Ltd clears.

Chart 10 Average daily flows over the UK PPS by currency(a)



Sources: LCH.Clearnet Ltd and Bank calculations.

(a) The data in **Chart 10** has been adjusted to exclude four days on which incorrect margin flows were generated and subsequently reversed.

Values have risen in the second half of the year, reflecting higher trading volumes as well as larger and more frequent margin calls during periods of increased market volatility (see Section 3.1). As a CCP, LCH.Clearnet Ltd takes on the credit risk of both counterparties in a single trade in a number of key markets, and the PPS is crucial to the practical implementation of LCH.Clearnet Ltd's management of its counterparty risk. Problems with the PPS therefore have the potential to cause wide disruption to the financial markets and institutions for which LCH.Clearnet Ltd clears.

As in the previous *Oversight Report*, the Bank assesses the UK PPS fully to observe eight of the nine relevant Core Principles for sterling and euro payments and seven of the nine relevant Core Principles for US dollars. For sterling, euro and US dollars, the UK PPS continues broadly to observe Core Principle III in relation to management of financial risks. For US dollars, the UK PPS is judged only partly to observe Core Principle VI due to risks posed by the current arrangements for settling US dollars, which use commercial bank money. For clarity, this is indicated for the first time in a separate column in **Table B**.

Settlement risk (Core Principles III and VI)

The 2006 *Oversight Report* noted that, following the introduction of a new SWIFT message type which allowed straight-through processing of transfers from PPS banks to the concentration bank,(1) performance in meeting the two-hour deadline for the transfer of funds from the PPS banks to the concentration bank had improved.

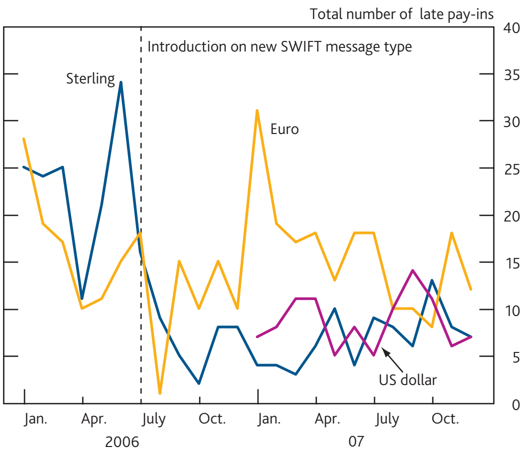
The terms and conditions for participation in the UK PPS, the *PPS Agreement*, specify the two-hour deadline for transferring funds from PPS banks to the concentration bank and also set out rules governing non-compliance. If the deadline is not met on four or more occasions during any one calendar month, LCH.Clearnet Ltd can demand explanations for non-compliance and proposals to prevent recurrence. If improvements are not made, LCH.Clearnet Ltd has the contractual right (but not the obligation) to terminate a PPS bank's participation in the UK PPS.

The 2006 *Oversight Report* noted that LCH.Clearnet Ltd's approach to the application of the procedures for dealing with late pay-ins by PPS banks did not fully reflect the terms of the *PPS Agreement*. It was noted that LCH.Clearnet Ltd exercised discretion in deciding the extent to which such procedures were applied. The Bank therefore encouraged LCH.Clearnet Ltd to follow up breaches by PPS banks fully in accordance with the provisions available to it within the *PPS Agreement*.

Over the past year, LCH.Clearnet Ltd has been working further to improve PPS banks' observance of the two-hour pay-in deadline. LCH.Clearnet Ltd has been taking a more active stance in enforcing the terms of the *PPS Agreement*. This has involved more thorough investigation of reasons for non-compliance and working with PPS banks on ways to improve performance.

Chart 11 shows the level of late pay-ins made by PPS banks per month. Overall, there continue to be instances where the deadline has been missed. The Bank therefore continues to assess the PPS as broadly observant of Core Principle III.

Chart 11 Number of late sterling, euro and US dollar pay-ins per month(a)



Sources: LCH.Clearnet Ltd and Bank calculations.

(a) Data relate to payments requested before 10:00.

LCH.Clearnet Ltd has used the Bank of England as its concentration bank for sterling and euro since September 2005, a move which eliminated the credit and liquidity risks posed by using a commercial bank settlement asset for these currencies. As discussed in the 2006 *Oversight Report*, the

(1) The Bank of England is the concentration bank for sterling and euro, Citibank is the concentration bank for US dollars, and HSBC is the concentration bank for other currencies.

Bank has recommended improvements to the UK PPS for US dollars, which currently uses a commercial bank as its concentration bank.

One solution LCH.Clearnet Ltd and the Bank are investigating is a mechanism for concentrating US dollar PPS flows in central bank money. Another potential solution would be the strengthening of current arrangements surrounding the concentration of US dollars in commercial bank money. During the course of 2007, LCH.Clearnet Ltd has reduced its exposure to its US dollar commercial concentration bank somewhat through the introduction of tri-party repo arrangements for its US dollar business. The Bank continues to assess the UK PPS for US dollars as partly observant of Core Principle VI.

Operational risk (Core Principle VII)

The PPS arrangements for the transfer of funds between LCH.Clearnet Ltd and the PPS banks employ the SWIFT messaging service. LCH.Clearnet Ltd has recently undertaken to improve this service further by adopting the SWIFTSupport Enhanced system. This new service aims to improve further the availability and reliability of SWIFT services provided to LCH.Clearnet Ltd.

Governance (Core Principle X)

LCH.Clearnet Group Ltd, the parent company of LCH.Clearnet Ltd, secured shareholder approval in June 2007 to repurchase the majority of shares held by Euronext, the largest shareholder of LCH.Clearnet Group Ltd. This restructuring is planned to be completed by 2009, after which LCH.Clearnet Group Ltd will be owned 73.3% by users, 10.9% by exchanges and 15.8% by Euroclear.

Strategy

LCH.Clearnet Ltd, along with all other CCPs, is facing a more competitive clearing environment. Competition is being driven by changes in the regulatory framework, specifically, the implementation of the Markets in Financial Instruments Directive, and developments stemming from the European Code of Conduct for Clearing and Settlement.

LCH.Clearnet Ltd, currently the sole clearer for the London Stock Exchange (LSE), is likely to face competition from 2008. Additionally, the IntercontinentalExchange (ICE) is in the process of setting up its own, vertically integrated, CCP (ICE Clear Europe) to clear its energy futures and OTC derivatives businesses which are currently cleared through LCH.Clearnet Ltd.

In response to these developments, and in order to provide a more attractive service to members, LCH.Clearnet Ltd has adopted a programme of reducing clearing fees paid by members across all business segments. LCH.Clearnet Ltd is also in the process of trying to gain entry to a number of markets for which it currently does not offer clearing services. In August 2007, LCH.Clearnet Ltd requested interoperability links under the Code of Conduct with both Deutsche Börse and Borsa Italiana. LCH.Clearnet Group Ltd has also announced plans for the two CCPs within the group (LCH.Clearnet Ltd and LCH.Clearnet SA) to form interoperability links with each other.

Competition in the provision of clearing services could lead to an increase in the number of multi-cleared exchanges — where more than one CCP clears for a single exchange. Together with the Joint Regulatory Authorities for the LCH.Clearnet Group, the Bank will be assessing these developments and considering the potential implications for risk management and resilience arising from such clearing models.

2.5 CLS

Continuous Linked Settlement (CLS) is designed to eliminate principal risk in the settlement of foreign exchange transactions. The US Federal Reserve authorised the establishment, and is the primary supervisor and lead overseer, of CLS Bank International (CLS Bank), the institution that provides the CLS service. Together with the other central banks (including the Bank of England) participating in the co-operative oversight of CLS, the Federal Reserve formally assesses the system against the Core Principles.

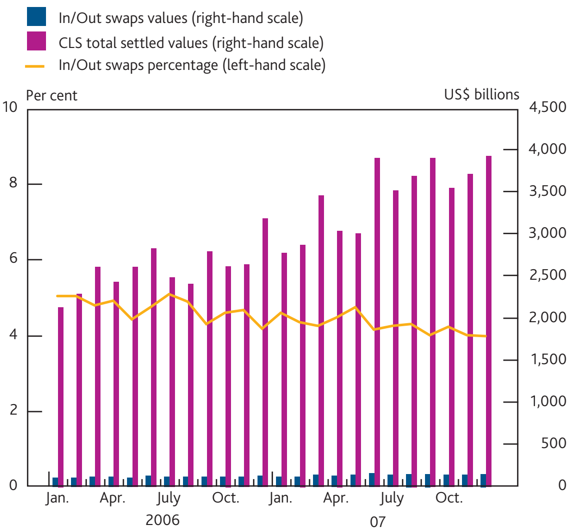
In line with the requirements for systemically important payment systems set out in the Federal Reserve's policy on payment systems risk,(1) CLS published a self-assessment against the Core Principles in December 2007. This provides transparency to users regarding CLS's risk management and other features, and is therefore welcome. CLS assesses itself to observe all ten Core Principles.

Settlement and liquidity risk (Core Principle III)

Central bank overseers seek to ensure that CLS Bank's risk management and operational procedures are effective and consistent with the Core Principles. As noted in previous *Oversight Reports*, one focus of oversight has been the use of the CLS Inside/Outside (I/O) swap mechanism. The mechanism is used by many settlement members to reduce the liquidity pressures generated by their pay-in requirements, but reintroduces principal risk outside the system.(2) **Chart 12** shows that the share of I/O swaps as a proportion of the total principal risk eliminated by the system

(1) Section I.C.3 of the Federal Reserve Policy on Payments System Risk, as amended effective 11 January 2007, available at www.federalreserve.gov/newsevents/press/other/other20070112a1.pdf. See also Section 3.3 of this *Report*.
(2) For more information, see 'Continuous Linked Settlement (CLS) and foreign exchange settlement risk', *Bank of England Financial Stability Review*, December 2004, pages 86–92 (available at www.bankofengland.co.uk/publications/fsr/2004/fsrfull0412.pdf). This article also gives more information on the Inside/Outside swap mechanism, as well as setting out more broadly issues relating to the contribution by CLS to reducing foreign exchange settlement risk.

Chart 12 Inside/Outside Swaps[(a)]



Source: CLS Bank International.

(a) The chart compares the average daily value of Inside/Outside swaps with the average daily total values settled in CLS (excluding I/O swaps). It also shows the percentage of principal risk reintroduced outside the system by the Inside/Outside swap mechanism.

remained relatively small in 2007, averaging around 4.2%. The liquidity/principal risk trade-off in CLS therefore remains acceptable.

CLS Bank continues to work with members to develop new ways of expanding the scope of the risk-reduction and cost-saving benefits that it offers. In September 2005, CLS Bank announced plans to offer a number of new services, and it is currently part-way through a programme to introduce them. In November 2007, CLS began operation of a service to settle payments arising from credit derivative contracts warehoused in DTCC's Deriv/SERV Trade Information Warehouse. Subsequently it has begun to settle cash flow positions for non-deliverable forwards, and in 2008 it will begin to offer a service for foreign exchange option premiums.

Overseers will be working with CLS to satisfy themselves that each new service is introduced without adding undue risks to the system or its members.

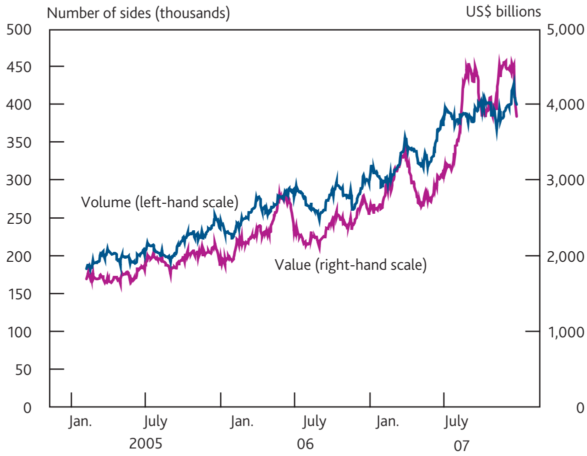
Future developments to the CLS service could also include the introduction of additional (earlier or later) settlement sessions, which could be used to settle same-day foreign exchange trades.[(1)] Such trades are agreed too late for settlement in the existing main settlement window, and therefore cannot currently benefit from the reduction in principal risk provided by CLS.

Foreign exchange settlement risk

The central banks that oversee CLS also consider risks arising from foreign exchange settlement more broadly, including monitoring the long-term progress of the strategy first set out in the 1996 *Allsopp Report*[(2)] to reduce foreign exchange settlement risk. In July 2007, the BIS published the results of its survey of foreign exchange settlement practices in a consultative report (see Box 1). It reported that CLS settled 55% of surveyed foreign exchange obligations by value during April 2006 — a significant share of the foreign exchange transactions of the largest banks active in the foreign exchange market.

Chart 13 shows that values and volumes of trades settled in CLS, and hence for which principal risk is eliminated, continued to increase in 2007. Factors responsible for the growth included a further increase in the number of third-party users (from 900 at the end of 2006 to 2195 at the end of 2007) and the rapid growth of the underlying foreign exchange market. Increased use of CLS by investment funds has driven the majority of the growth in numbers of third-party users.

Chart 13 Daily volumes and values settled in CLS (30-day moving average)[(a)]



Source: CLS Bank International.

(a) The unit of measurement for trade volumes is 'sides'; there are two sides to each transaction. Both sides are counted in the value figures.

In the United Kingdom, the four major banks operating in the foreign exchange market (Barclays, HSBC, RBS and Standard Chartered) have been settlement members since CLS went live (although not all their transactions are eligible for CLS). A number of other UK banks active in the foreign exchange market participate in CLS as third-party users, as do two UK building societies. However, only a few other UK non-bank institutions are currently third-party users.

During 2007, CLS Bank made two changes aimed at widening the population of settlement members and currencies: first, it lowered the minimum standards for member and sovereign credit risk (subject to other more rigorous risk limits being applied in such cases); and second, it proposed new terms on which central banks could join as settlement members.

(1) This might include settling some of the current out legs of Inside/Outside swap transactions.
(2) BIS (1996), *Settlement Risk in Foreign Exchange Transactions*, available at www.bis.org/publ/cpss17.htm.

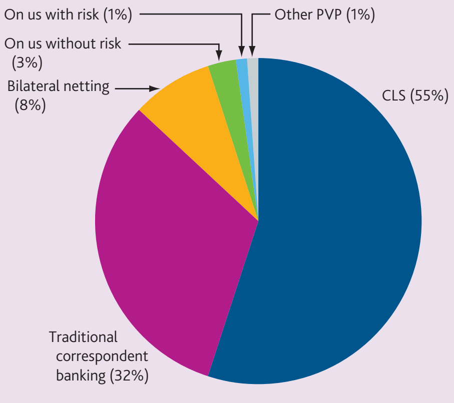
Box 1 Foreign exchange settlement risk

Foreign exchange settlement risk (FXSR) is the risk that one party to a foreign exchange trade pays out the currency it has sold but does not receive the currency it has bought (for example, due to the insolvency of its counterparty). It arises chiefly because of the difficulty of co-ordinating the timing of settlement of two currencies in different payment systems.

In 2006, ten years after first endorsing a strategy to reduce the systemic risk arising from exposures to FXSR, central banks decided to assess the extent to which FXSR had been reduced, and to determine whether further action was needed. To support this assessment, a global survey was conducted during April 2006. An analysis of the results, *Progress in reducing foreign exchange settlement risk*, was published by the BIS in the form of a consultative report in July 2007.(1)

The survey revealed that almost US$1.3 trillion a day (33% of total settlement obligations) was settled using traditional correspondent banking, or settled 'on us' (where both legs of the foreign exchange trade are settled across the books of a single institution), in a way that could expose participants to FXSR (**Chart A**). Nevertheless, this was a significant improvement on the position at the time of the previous survey in 1997, when 85% of obligations incurred settlement risk. The major driver of this reduction has been the introduction of CLS. Despite this progress, the nominal total amount of transactions subject to FXSR is now greater than the total amount of obligations recorded in the 1997 survey, because of the vast growth in global foreign exchange turnover in the intervening period.

Chart A Breakdown of total settlement obligations according to settlement method



Source: BIS.

FXSR exposures typically last longer than one day, with institutions often committing themselves irrevocably to making a payment the day *before* it is due, and not being able to reconcile receipt of the counter-currency until the day *after* it is due. Over 60% of the institutions surveyed underestimated the duration of their exposures.

The report noted that institutions could take action to reduce the durations of their exposures, for example by having later cancellation deadlines or more timely information about receipts (for example, by changing their arrangements with correspondents). They could also change their credit risk measurement methods to avoid underestimating the exposures that do exist. The report encourages institutions to treat FXSR exposures in the same way as any other short-term credit extensions.

FXSR exposures can be completely eliminated by payment versus payment systems, of which CLS is currently the only significant example.(2) But not all market participants currently use CLS. Of the US$1.3 trillion of obligations subject to settlement risk each day, 64% involved at least one party that was not a user of CLS. Between CLS users, US$0.4 trillion of obligations were subject to settlement risk. Some of this was due to one or both of the currencies involved not being eligible for settlement in CLS; but a significant factor was that CLS is currently unable to settle transactions for same-day value.

The report concludes that further work is needed to progress central banks' risk reduction strategy, and three sets of actions are identified. First, individual institutions are urged to manage their remaining exposures appropriately, both by using risk-reducing services such as CLS (and encouraging counterparties to do so), and by reducing the duration of, and avoiding underestimation of, the FXSR exposures that remain. Second, industry bodies should work to heighten awareness and encourage progress in addressing FXSR, whilst providers of services should develop new facilities that will allow the settlement of a greater proportion of obligations without settlement risk. This could include the development of same-day settlement services and/or the introduction of new currencies. Finally, the report recommends that central banks continue to encourage and support such actions, and work with banking supervisors and other financial regulators to explore options that could ensure that institutions apply appropriate risk management procedures to their FXSR exposures.

(1) The report is available at www.bis.org/publ/cpss81.pdf.
(2) Other payment-versus-payment (PvP) systems captured around 1% of settlement obligations.

CLS's share of foreign exchange transactions might also be increased by introducing more currencies. New currencies may be introduced into the system if they satisfy CLS's eligibility criteria, and the system continues to observe the Core Principles. The next two currencies CLS Bank plans to introduce are the Mexican peso and the Israeli shekel.

Operational risk (Core Principle VII)

Management of operational risk is given a high priority by CLS Bank and the overseeing central banks, in particular to minimise the potential cross-border impact of an operational failure affecting any of its settled currencies. During 2007 there were no instances of CLS failing to settle transactions on their intended settlement day, and although it experienced some significant incidents, these had little adverse impact on settlement and pay-out target deadlines. The most significant incident occurred in December, when one of CLS's data centres lost power. But CLS recovered to another data centre within two hours and completed settlement less than one hour later than normal. It also experienced occasional SWIFT connectivity problems, affecting transaction submission or the settlement process.

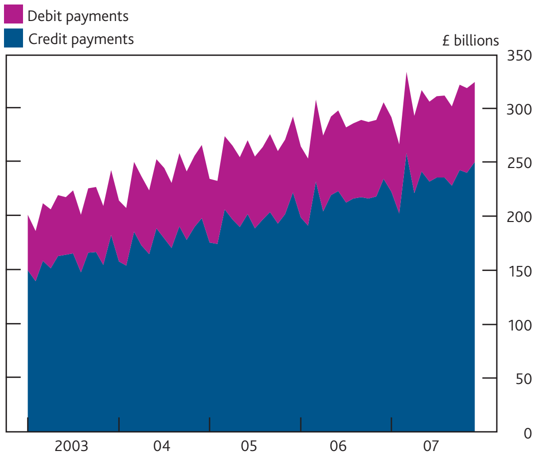
CLS was also affected by two market-wide events. On 23 March 2007, an outage of a SWIFT data centre caused an interruption to services using SWIFT for 40 minutes, including communications to and from CLS. There was no significant disruption to CLS although some entities experienced problems re-connecting. On another occasion, during market turbulence in August 2007, CLS was affected by the large volumes of transactions being submitted (see Section 3.1). Its gateways for transaction submission were closed for two hours on 16 August 2007 to allow pre-emptive action to relieve a potential capacity constraint. That delay, and capacity issues experienced by some of its members, required CLS to extend the period in which trades could be submitted; but ultimately all the trades submitted were settled successfully. CLS also demonstrated its capacity to settle large volumes of transactions on 13 November 2007, a day on which a record of over one million sides were settled successfully.

CLS Bank has continued to take initiatives to strengthen its resilience to a major operational disruption. A major project to improve physical resilience further, by implementing an out-of-region data centre, was completed in 2007. CLS Bank also introduced additional systems to allow settlement to be completed even in the event of its core system being unavailable. During 2008, further work is planned to increase operational resilience by providing out-of-region resilience to its existing 24 hour operational and member support.

2.6 Bacs

Bacs is the United Kingdom's largest retail payment system by volume, processing on average 21.9 million electronic payments a day in 2007, with an average daily value of £14.6 billion. In 2007, the number of payments processed by Bacs grew by 3%, while the total value of payments grew by 8% (**Chart 14**).

Chart 14 Monthly values processed in Bacs by payment instrument



Sources: APACS and VocaLink Ltd calculations.

Bacs's membership was stable during 2007; there are currently 15 members, 668 Bacs Approved Bureaux (BABs)(1) and 38 Affiliates.(2)

Bacs Payment Schemes Ltd (BPSL) is responsible for the Bacs Direct Debit, Direct Credit and standing order products. The core processing of Bacs transactions is outsourced to a single third party, VocaLink Ltd, which was established following the merger of Voca Ltd and LINK Interchange Network Ltd in July 2007.

The previous *Oversight Report* assessed Bacs as fully observing four Core Principles and broadly observing a further five. In relation to Core Principle VIII — concerning the system providing a means of making payments which is practical for its users and efficient for the economy — the Bank assessed Bacs to be partly observant.

This year, the Bank's assessment of Bacs is unchanged. During 2007, progress has been made in a number of areas and the Bank looks forward to the consolidation of this work and further improvements in 2008.

NewBacs

In July 2006, Phase I of the NewBacs project was implemented successfully. It delivered an updated processing platform

(1) A BAB is an organisation (normally a computer bureau) that wishes to submit financial transactions through the Bacs clearing system on behalf of external third-party organisations.
(2) The Bacs Affiliate class was introduced in December 2005. Anyone can apply to become a Bacs Affiliate; membership includes current account providers, originators of high volumes of Direct Debits and/or Bacs Direct Credit payments, providers of financial or telecommunications software, Bacs bureaux service providers, trade bodies etc.

required to ensure sufficient capacity for expected future payment volumes and offered the ability to implement risk-reducing functionality such as debit thresholds and regression (discussed below). Phase II, the move of the REMIT application(1) onto a more modern architecture, was completed in December 2006.

The final step in the technology renewal at VocaLink Ltd is the migration of members from the legacy High Speed Transmission (HST) channel to either VocaLink Ltd's IP based channel, Enhanced Transmission Services, or SWIFTNet Transmission Services. This was achieved for most members during 2007 and it is expected that all members will have migrated from HST by the early part of 2008.

Settlement risk (Core Principles III and V)

In the previous *Oversight Report*, the Bank assessed Bacs as broadly observing Core Principles III and V. This assessment has not changed.

While the introduction of the *Liquidity Funding and Collateralisation Agreement* (LFCA) in 2005 significantly reduced settlement risk in Bacs (and the C&CC), it did not eliminate it completely. This is because it is still possible for an affected member's obligations to the system to exceed the total liquidity committed by other members under the LFCA. The functionality provided by NewBacs could be used to mitigate this settlement risk further by implementing thresholds to members' debit positions in Bacs. Work exploring the various issues around introducing debit thresholds continued throughout 2007.

Further, current arrangements for removing an affected member's payments from the Bacs system can be cumbersome. NewBacs enables the wholesale removal of an affected member's payments, allowing remaining members to settle (this functionality is know as 'regression'). System exclusion functionality is also available to remove payments from a specific time, or from the start of the next processing day. Given that Bacs operates a three-day settlement cycle, removing the affected member's intraday commitments on the day of default and before those payments become irrevocable would further reduce the probability that its settlement obligations would be larger than the aggregate liquidity committed under the LFCA.

The timely implementation of the regression functionality and the ability to apply, in certain circumstances, appropriate debit thresholds should help to lower settlement risk in Bacs further, and deliver greater observance of Core Principles III and V. Against the backdrop of recent market turbulence, the Bank also supports BPSL's ongoing assessment of the LFCA which is important from the perspective of understanding the limits of the agreement and highlighting any operational issues.

During 2007, further progress has also been made towards a shorter Bacs settlement cycle (for example, where a customer's account is debited or credited as early as one day after the payment file is submitted). A shorter cycle would further reduce settlement risk by cutting the time between when payments become irrevocable and when net positions are settled, thus reducing the likelihood of a member default occurring during this time. BPSL should consult with its members and VocaLink Ltd to assess the appetite for and risks of introducing a shorter cycle.

Faster Payments

The introduction of Faster Payments has been delayed to May 2008 (see Section 2.1). As noted in the previous *Oversight Report*, the introduction of Faster Payments will reduce settlement risk for some payments currently processed through Bacs by offering an alternative service with a shorter settlement cycle. It is expected that most standing order payments will migrate to Faster Payments. However, system interdependencies will increase as both Bacs and Faster Payments will share some of the central VocaLink Ltd infrastructure (system interdependencies are discussed in more detail in Section 3.2). As well as working together to ensure the successful and timely introduction of the new facility, CHAPSCo (the Faster Payments scheme management company) and BPSL will need to understand, and take appropriate steps to mitigate, the potential impact of a member-specific problem or a failure of VocaLink Ltd's settlement infrastructure.

As in the previous *Oversight Report*, the Bank assesses Bacs as partly observing Core Principle VIII in the absence of a two-day (or shorter) settlement cycle. While the successful introduction of Faster Payments is outside the direct control of Bacs, it is expected that most standing order payments will migrate to Faster Payments once it is introduced. Provided that this occurs, it may assist Bacs to achieve a higher level of observance of Core Principle VIII because the payments that would remain with Bacs (generally Direct Debits and Direct Credits) would be processed by a system with a settlement cycle that is more appropriate for those payments.

In October 2007, given the Bank's decision not to participate in TARGET2, Bacs (and the C&CC) euro settlement services moved from the Bank to the Central Bank and Financial Services Authority of Ireland. The transition was planned well and progressed smoothly.

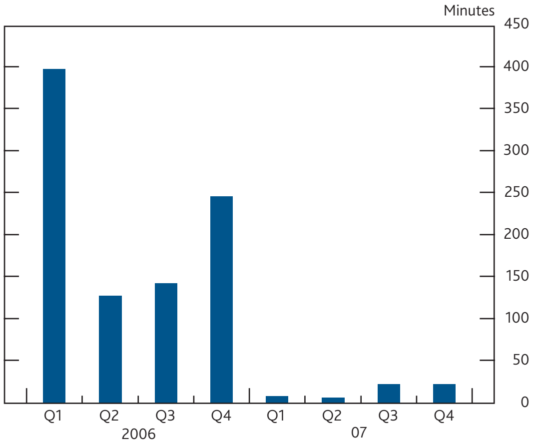
Operational risk (Core Principle VII)

BPSL has documented a wide range of operational risk controls applicable to member banks and users of Bacs. In particular, the implementation of the *Direct Debit Recall Agreement* in 2007 delivers benefits for all members and users of the

(1) REMIT is an interbank payments service designed to accommodate payments with a large amount of reference information (including remittance advice).

system, particularly in relation to reducing operational risk in a default scenario. Cumulative delays to settlement caused by members were substantially lower in 2007 than in 2006, and each incident was of short duration (**Chart 15**).

Chart 15 Cumulative settlement delays in Bacs



Source: Bank of England.

In March 2007, Bacs experienced a slowdown in the central Bacstel-IP[1] service resulting in some originators being unable to connect to the service by the normal submission deadline. The system was kept open to allow these files to be submitted, however, as they were submitted after the normal closedown time, some submitters' (non-VocaLink Ltd) software moved the payment date forward by one day. As a result of the slowdown in Bacstel-IP and the subsequent date stamping issue, around 450,000 payments were applied late to customers' accounts.[2] The incident received considerable media attention.

The Bank has discussed this incident in detail with BPSL and VocaLink Ltd and continues to follow up on operational issues, focusing particularly on the lessons for *ex-ante* risk mitigation and *ex-post* communication and disaster recovery. BPSL and VocaLink Ltd have undertaken an extensive Post Incident Review drawing together the lessons from this incident, and have implemented significant improvements to internal processes. These include: updating the resilience of and support for the Bacstel-IP channel; measures to limit and identify more quickly any date stamping inaccuracies; and procedures to enhance incident communication. The Payments Council has also established a process for convening, in the early stages of an incident, a senior group of representatives from banks, the Payments Council, the Bank and the systems to consider cross-scheme issues and public communication.

More generally, an improvement to the existing Service Level Agreement (SLA) for the availability of Bacstel-IP is currently being agreed between Bacs and VocaLink Ltd. This would increase the existing 99.5% availability requirement, measured monthly, to a 99.7% requirement, measured over a rolling three-month period. After a six-month measurement period, if the improved SLA is achieved, and subject to agreement with VocaLink Ltd, the SLA will become a 99.7% availability requirement, measured monthly. This would begin in August 2008. The Bank encourages BPSL and VocaLink Ltd to agree this increase as tighter operational controls would help to deliver greater observance of Core Principle VII.

In light of the issues highlighted by the operational incident described above, the Bank assesses Bacs broadly to have observed Core Principle VII. The Bank will reconsider this assessment once changes arising from the Post Incident Review have had time to bed down and should tighter operational controls be implemented in connection with an enhanced SLA availability requirement.

Business continuity planning (Core Principles V and VII)

As the March 2007 incident illustrates, it is vital for member banks to understand the potential implications of operational problems at VocaLink Ltd which could cause significant disruption to processing. A delay of more than one processing day could mean that members would need to process two or more days' payments in a single day.

During 2007, BPSL has developed an extensive disaster recovery framework which has involved looking at how quickly Bacs, the VocaLink Ltd infrastructure and members could process payments in order to catch up following a delay. The framework outlines communication plans and how cycles would be run in particular scenarios. The Bank believes that it will be important to conduct a formal test of the framework.

Access and governance (Core Principles IX and X)

The previous *Oversight Report* assessed Bacs as broadly observing Core Principles IX and X. This assessment has not changed, though Bacs has continued to work throughout 2007 to improve access and governance arrangements, and to encourage wider membership.

For a number of years, BPSL and the C&CCC have been considering the implications for their schemes of a member with a deteriorating credit rating, which could bring heightened financial risk to multilateral net settlement. The recent market turbulence has highlighted the importance of this issue. BPSL and the Bacs and C&CC members progressed work looking at members' credit ratings during 2007. The Bank has encouraged BPSL and the Bacs and C&CC members to complete this work, including an assessment of when such measures are likely to be beneficial.

(1) Bacstel-IP is the channel through which organisations submit payment files directly to Bacs.
(2) The date-stamping issue was identified on Friday 30 March 2007, however, due to actions taken by some banks, most customers had access to these payments on Saturday 31 March 2007.

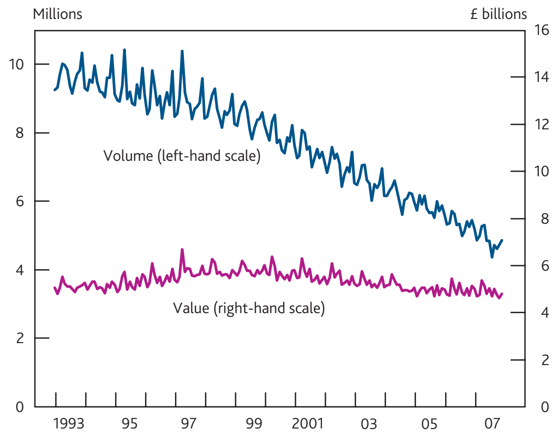
Strategic issues

BPSL and VocaLink Ltd are actively developing internal standards to ensure compliance with Single Euro Payments Area (SEPA) standards. Both consider that adopting SEPA standards could enable them to exploit a wider range of infrastructure options in the future, including within the euro area.

2.7 The Cheque and Credit Clearings

The Cheque and Credit Clearings (C&CC) enable instructions given in paper form (cheques and paper credits) to be processed, exchanged and settled between banks. The C&CC are managed by the Cheque and Credit Clearing Company (C&CCC). In 2007, the paper clearings processed an average of around 4.8 million payments each day, with a total value of around £4.8 billion. The number of C&CC payments processed has declined by around 50% since 1993. The nominal value of payments processed has been broadly stable for the past three years. (**Chart 16**).(1)

Chart 16 Average daily volume and value of payments processed in the C&CC(a)



Sources: APACS and Bank calculations.

(a) Volumes and values include items drawn on other banks only.

In the previous *Oversight Report*, the Bank assessed the C&CC to observe eight of the Core Principles either fully or broadly. Core Principles I and VIII were partly observed. This year, the Bank assesses the C&CC to broadly observe Core Principle VIII. The other assessments are unchanged, although progress has been made to strengthen observance of a number of Core Principles, in particular Core Principle I.

Legal risk (Core Principle I) and settlement risk (Core Principles II, III, IV and V)

During 2007, progress has been made in relation to the C&CCC's application for designation under the *Financial Markets and Insolvency (Settlement Finality) Regulations* (1999) (FMIRs), which implement the EU Settlement Finality Directive (SFD) in the United Kingdom. Additionally, the *Cheque and Debit Recall Agreement* was signed as expected by the members, strengthening observance of Core Principle I.

The C&CCC Board submitted an application to the Bank for designation under the FMIRs in May 2007. The Bank's Designation Committee requested additional assurance on a number of issues, about which the C&CCC continues to liaise with both its members and the Bank. Designation under the SFD would provide additional assurance of the enforceability of the system's default arrangements and further strengthen observance of Core Principle I and IV.

The *Cheque and Debit Recall Agreement* aims to prevent an insolvency practitioner seeking to return, via the unpaids process, cheques drawn on a failed member (unless permitted under usual procedures).(2) This agreement has now been signed, reducing legal, credit and operational risk within the system and strengthening the system's observance of Core Principles I, II, III and VII.

In October 2007, given the Bank's decision not to participate in TARGET2, C&CC euro debit settlement migrated from the Bank of England to the Central Bank and Financial Services Authority of Ireland. The C&CCC has decided to retain the LFCA(3) arrangements for sterling payments only, leaving the new euro settlement arrangements without a liquidity funding arrangement. Therefore, if a member failed to fund its euro settlement obligation for any reason, a euro non-settlement day would result. Because of the values and volumes involved, however, the associated risks and implications are judged to be small and the Bank has accepted that no new agreement is necessary.

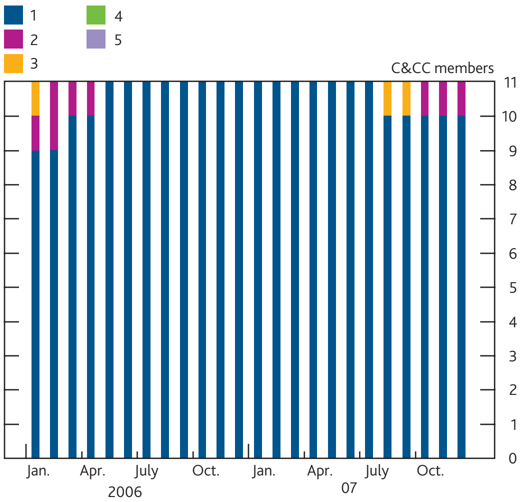
Operational risk (Core Principle VII)

Operational performance has continued to be generally strong following improvements made in 2005 and early 2006. Performance weakened slightly when one member experienced some difficulties implementing a new system in August 2007. This is expected to be temporary, however, and indeed performance improved again towards the end of 2007 (**Chart 17**).

The C&CC is a highly decentralised system and members are individually responsible for the processing of their paper, with most having chosen to outsource this function to third-party suppliers. The Bank has been encouraged that, during 2007, the C&CCC has involved third-party suppliers in a number of

(1) These figures include items drawn on other banks only, that is payments that pass through the clearings. Items drawn on other branches of the same bank are not included.
(2) There are instances in which a cheque might not be paid by the paying member bank — for example, if the payer had insufficient funds in its account to cover the full value of the cheque. The unpaids process is used to return to the collecting member bank those cheques that cannot be paid by the paying member bank.
(3) The *Liquidity Funding and Collateralisation Agreement* (LFCA) aims to ensure that settlement can complete across the C&CC and Bacs in the event of a member default. Each member contributes collateral according to the amount of risk they bring to the two systems.

Chart 17 Operational performance against Service Level Codes[a]



Sources: C&CCC and Bank calculations.

(a) Performance against the Service Level Codes, which set out operational performance expected of members, is categorised from 1 to 5, with 1 being the best performance.

committees, specifically relating to industry-wide projects such as 'T plus 2-4-6', and would like to see this trend continue.

If this decentralised processing model were to change, a different operational structure might be preferable. For example, if further consolidation led to the creation of a single infrastructure provider, a contractual model similar to Bacs, where the infrastructure provider has entered into a service level agreement with both the scheme and its individual members, might be better. This would allow for greater leverage on the supplier, and more transparency between members, the supplier and the scheme as a whole. In the meantime, the C&CCC is undertaking work to ensure it receives adequate assurances in respect of the risks posed by multiple member/supplier relationships.

Observance of Core Principle VII (and Core Principle X) would be strengthened if the direct relationship between the C&CCC, the scheme and third-party suppliers was more clearly defined. The C&CCC obtaining adequate assurance from third-party suppliers of their compliance with the system's requirements would also strengthen observance.

Efficiency (Core Principle VIII)

The previous *Oversight Report* described the 'T plus 2-4-6' proposition that was recommended by the Cheque Working Group (CWG).[1] This was successfully implemented in November 2007, and sets maximum clearing times for value (T+2), withdrawal (T+4) and certainty of fate (T+6)[2] for sterling cheques deposited in the United Kingdom. The '2-4-6' framework represents a core offering: financial institutions will, as before, be able to compete to offer shorter timescales.

The CWG considered the possibility of a shorter core clearing cycle, but concluded that the costs of such a change far outweighed the benefits. The declining use of cheques, which may accelerate with the introduction of Faster Payments, further weakened any business case for change.

Given this constraint on realistically achievable efficiency levels, the Bank assesses Core Principle VIII as broadly observed, compared to the assessment of partial observance in the previous *Oversight Report*.

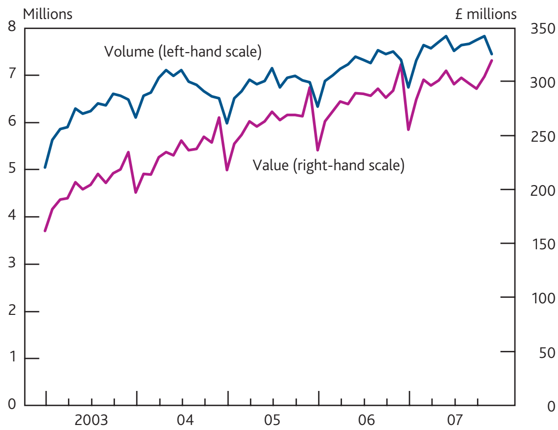
Access and governance (Core Principles IX and X)

Previous *Oversight Reports* have described the need for clarification in the system rules for dealing with a settlement member whose credit quality deteriorates to an extent that it poses a high level of financial risk to multilateral settlement. Work on this issue has taken place during 2007, although final proposals are yet to be made. Implementation of the updated system rules would further strengthen observance of Core Principle IX.

2.8 LINK

LINK is the United Kingdom's largest automated teller machine (ATM) network, which enables its members' customers to withdraw cash from almost all of the United Kingdom's ATMs, irrespective of the bank at which they hold their account. In 2007, LINK ATM Scheme transactions averaged 7.5 million per day (mainly cash withdrawals and balance enquiries), with an average aggregate value of around £296 million (**Chart 18**).

Chart 18 Average daily volume and value LINK Scheme transactions[a]



Source: LINK.

(a) Volumes include non-cash withdrawal transactions (such as balance enquiries).

(1) T is defined as the day of deposit of the cheque. The CWG was established by the OFT-chaired Payment Systems Task Force in October 2005 to investigate whether greater efficiency could be introduced into the cheque clearings.

(2) Fate means that the recipient of the payment can be certain that the money is theirs, and that it cannot be reclaimed unless fraud is involved and the beneficiary is a knowing party. Previously customers did not receive certainty of fate on cheques, as no point was defined after which a cheque could not be returned as fraudulent, or returned as unpaid.

In July 2007, LINK Interchange Network Ltd, which provides processing services to LINK ATM Scheme members, merged with Voca Ltd to create the VocaLink Group (see Section 2.6).

The 2006 *Oversight Report* assessed the LINK ATM Scheme fully or broadly to observe all ten of the Core Principles. This assessment has not changed.

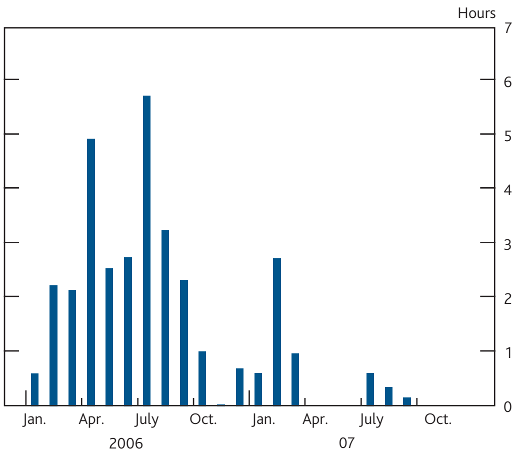
Legal risk (Core Principle I)

As noted in previous *Oversight Reports*, additional assurance on the enforceability of the system's default arrangements might be obtained if the Scheme was designated under the UK settlement finality regulations. Designation could enable the Scheme to be fully observant of Core Principle I.

Settlement risk (Core Principles III and IV)

The frequency and severity of delays to settlement have been reduced substantially during 2007 (**Chart 19**). An important contributing factor has been LINK's continued encouragement of those card issuing Scheme members using Bank of England banking accounts for settlement to migrate to Bank of England reserve accounts in RTGS. Target balances on reserve accounts typically exceed settlement obligations in LINK. Additionally, banking accounts typically pay less than Bank Rate, making it less attractive to hold a large balance in them. The probability that additional funding will need to be added in the event of an unexpectedly large debit position is hence lower for members using reserve accounts for settlement, reducing the likelihood of delay to settlement. Card issuing members ineligible for reserve accounts are being encouraged to settle through the reserve account of a member that is eligible. The majority of affected members have now completed their migration, although a few have yet to do so. This strengthens observance of Core Principle IV.

Chart 19 Settlement delays in LINK[(a)(b)]



Sources: Bank of England and Bank calculations.

(a) LINK daily settlement should take place by 11:30.
(b) Excludes 12 February 2007 data where delays were caused by RTGS.

The 2006 *Oversight Report* noted that, following implementation of a number of measures to improve settlement performance, a large proportion of the remaining settlement delays were caused by the Funds Transfer Sharing (FTS) group, who settle amongst themselves before settling in LINK as a group. Delays were most frequently due to FTS failing to fax settlement figures to the Bank in a timely manner, rather than a member of the FTS group failing to settle on time. FTS settlement performance has recently improved, but FTS members have decided that the most effective long-term solution is for FTS to disband and for individual FTS members to settle in LINK directly. The FTS group is expected to disband in 2008 Q2. This should help to reduce delays to settlement and so further strengthen observance of Core Principle IV.

VocaLink Ltd has continued to develop a new settlement system capable of monitoring participants' settlement positions intraday, which is expected to be implemented by 2008 Q3. This would also make it possible for debit threshold arrangements to be introduced. Appropriate use of this functionality would allow better management of credit and liquidity risks, further strengthening observance of Core Principle III.

Operational risk (Core Principle VII)

VocaLink Ltd currently maintains a 'warm' back-up site. It is planned to replace this in 2009 with a 'live' site, to allow continuous processing of transactions over two sites. This will help strengthen observance of Core Principle VII.

There are no immediate plans for integration of infrastructure or disaster recovery sites as a result of the merger of Voca Ltd and LINK Interchange Network Ltd.

2.9 Debit and credit cards

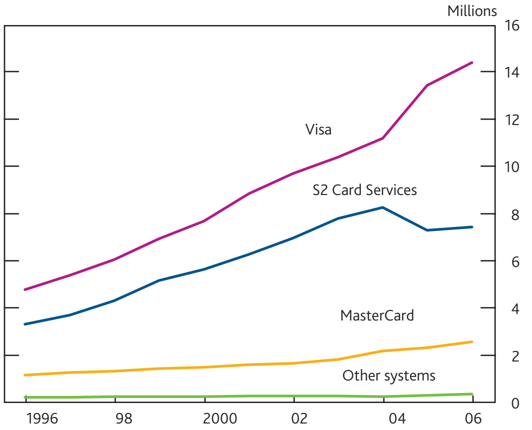
The main debit and credit card systems in the United Kingdom are operated by Visa Europe and MasterCard Europe. These systems process an average of 24.5 million electronic payments worth around £1.4 billion per day (**Charts 20** and **21**). Since 2004, MasterCard Europe has been responsible for the authorisation, clearing and processing of S2 Card Services' transactions, which owns the Switch and Solo branded debit cards. In the same year, the Switch scheme was rebranded to MasterCard's Maestro debit brand.

UK Maestro

The UK Domestic Maestro debit card scheme meets three of the Core Principles fully, and meets a further five broadly. The Bank judges that the level of compliance did not change in 2007.

The main area where improvement would be desirable continues to be the definition of the point of final settlement. In particular, this weakness means the scheme only partly observes Core Principle I.

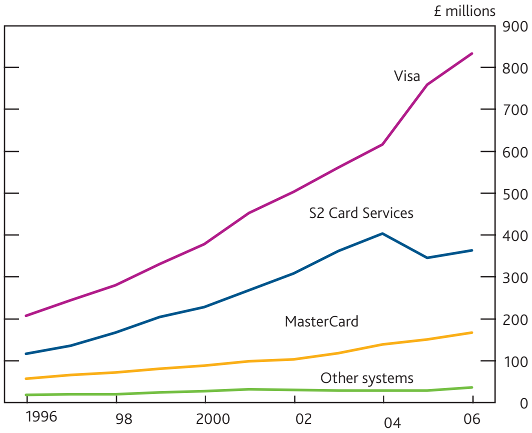
Chart 20 Average daily volume of payments through the debit and credit card systems(a)(b)



Sources: APACS and Bank calculations.

(a) Data includes 'on us' transactions (where the merchant and cardholder use the same member/licensee). 'On us' transactions are processed internally by the member/licensee.
(b) S2 Card Services includes Maestro and Solo transactions and Visa includes both Visa debit and Visa Credit transactions.

Chart 21 Average daily value of payments through the debit and credit card systems(a)(b)



Sources: APACS and Bank calculations.

(a) Data includes 'on us' transactions (where the merchant and cardholder use the same member/licensee). 'On us' transactions are processed internally by the member/licensee.
(b) S2 Card Services includes Maestro and Solo transactions and Visa includes both Visa debit and Visa Credit transactions.

The EU Payment Services Directive aims to harmonise the regulatory and legal framework for payment services in the EU. It was adopted by the European Council and Parliament in November 2007, and member states, including the United Kingdom, must implement its provisions into national law by November 2009. As a four-party card scheme,[1] UK Domestic Maestro will be largely unaffected, although Article 28 — which defines right of access to payment systems — will have some impact. The Directive could mean that membership criteria for the scheme will have to be clarified, helping to strengthen the scheme's observance of Core Principle IX.

Other debit and credit cards

The Bank has not assessed the Visa credit, Visa debit or MasterCard credit schemes against the Core Principles, but continues to liaise with both Visa Europe and MasterCard Europe over their sterling settlement arrangements and business continuity planning.

Management of the MasterCard credit and Visa credit and debit schemes is conducted on an international basis, and the Bank discusses with other central banks how they can best co-operate to oversee these schemes. In particular, the Bank involves the European Central Bank (ECB) in the oversight of Visa Europe as, although located in London, Visa Europe is a significant operator in the euro-area credit card market. Additionally, the Bank has continued to participate in an ECB initiative to develop Oversight Standards for Card Payment Schemes offering services in euro inside the euro area. The Standards focus on operational and settlement arrangements, legal basis, transparency and governance, and were published in January 2008.[2]

In September 2007 both Visa Europe and MasterCard Europe started rolling out contactless payment technology in parts of London. This allows users to use their Visa or MasterCard debit or credit cards to pay for purchases of up to £10 in value without entering a PIN.

2.10 SWIFT

SWIFT provides secure messaging services to financial institutions and market infrastructures covering nearly 8,300 users in over 200 countries. SWIFT is used by CHAPS, CREST, LCH.Clearnet Ltd and CLS — each important to the financial stability of the United Kingdom. For this reason, even though SWIFT is not a payment or settlement system itself, its services are of systemic importance to the United Kingdom.

The Bank participates with other G10 central banks in the co-operative oversight of SWIFT, with the National Bank of Belgium as lead overseer (SWIFT's headquarters are in Belgium). The overseers' objective is to seek assurance that SWIFT appropriately manages risks to its operations that could otherwise threaten the smooth functioning of the international financial system.

The co-operative oversight process has been enhanced by the introduction of a High Level Expectations (HLEs) framework. The National Bank of Belgium published the HLEs in its 2007 *Financial Stability Review*.[3]

Operational risk

Reliability and resilience

Performance has been less strong than in previous years but the high target availability of 99.974%[4] has been achieved in

(1) Four-party card schemes involve four parties in each transaction: the cardholder, merchant, card issuing bank and acquiring (ie merchant's) bank.
(2) Available at www.ecb.int/pub/pdf/other/oversightfwcardpaymentsss200801en.pdf.
(3) Available at www.nbb.be/pub/06_00_00_00_00/06_03_00_00_00/06_03_02_00_00/FSR_2007 0621z.htm?l=en&t=ho.
(4) This is a 'weighted-availability' target calculated by SWIFT on the basis of the volume of traffic affected. Individual SWIFT users may experience lower availability.

Box 2 SWIFT re-architecture

The SWIFT Board approved a proposal for a strategic re-architecture on 29 September 2007. A new distributed architecture will provide segregation between the European and Trans-Atlantic zones.[1] The addition of another operating centre should improve resilience. The re-architecture is intended to meet four strategic objectives: improve SWIFT's commercial position; improve resilience; control costs; and address data privacy concerns by the introduction of zoning. The strategic re-architecture project will be implemented in two phases, with Phase 1 due to complete in 2009 and Phase 2 completing in 2012.

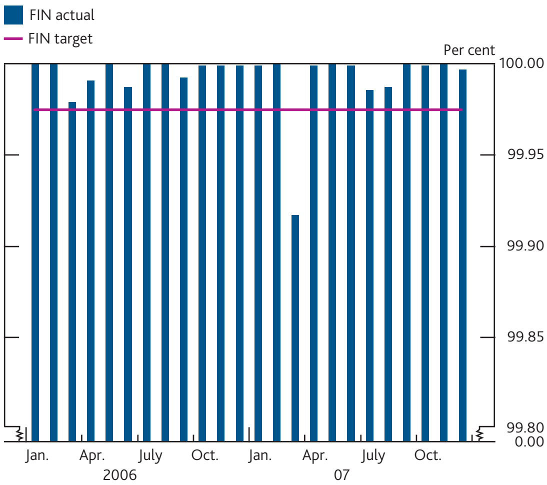
Oversight of the re-architecture is a key topic for the overseers ensuring that SWIFT has appropriate risk identification and management processes. Overseers will focus on operational risks to ensure resilience levels remain consistently high and that traffic segregation between zones does not affect financial stability or capacity planning.

Other priorities for overseers will be to: monitor any implementation risks arising from the reprioritisation of SWIFT's business as usual work; monitor the management of key project dependencies; and gain reassurances over project governance.

(1) SWIFT's definition for the European Zone is to contain all EEA countries and Switzerland.

all but one month, March 2007 (**Chart 22**). SWIFT's FIN messaging service was affected by a major power outage at one of its operating centres on 23 March 2007. Since that incident, SWIFT has been working to mitigate the risk of future outages, and reporting progress on follow up actions to overseers. SWIFT has also taken action to improve communication with users in the event of an outage.

Chart 22 Weighted availability of SWIFT FIN[a]



Source: SWIFT.

(a) Weighted availability is calculated by SWIFT. It takes into account the percentage of SWIFT users without access to SWIFT services and the length of time they are without this access.

Member connectivity

While the availability of the SWIFT infrastructure is of systemic importance, individual SWIFT users must also ensure the resilience of their connections to SWIFT. The Bank encourages users to participate in regular SWIFT testing and the FSA discusses with firms their resilience arrangements, including for SWIFT.

SWIFT conducted the 2007 test of its disaster recovery capabilities on 21 April. It invited all SWIFTSupport Enhanced customers to participate and 85% of invited customers took part. In February 2008, the Bank and CHAPS also tested members' procedures for reconciling messages in the event of SWIFT becoming unavailable.

SWIFT also invited all SWIFTSupport Enhanced customers to participate in an Operating Centre recovery test on 20 October. The participation rate was only 64% but no major issues were reported by those that took part.

The Bank welcomes such user testing and communication on business continuity issues, a theme raised in the October 2007 *Financial Stability Report*[1] and Section 3.2 of this *Report*. SWIFT guidelines set out the advantage of using two network providers to connect to SWIFT as this significantly enhances availability. In the third quarter of 2007, customers with dual connections experienced on average less than one minute of downtime, whereas those with a single connection experienced an average total downtime of over eleven minutes.[2]

Information security

Overseers welcomed the annual publication of the SAS70 report commissioned by SWIFT. This report (which is available to all SWIFT users) is one means by which overseers have sought to understand whether information security risks are managed appropriately.

Projects

SWIFTNet FIN is SWIFT's core messaging service and 2007 was a critical year for the SWIFTNet FIN Phase 2 project with customers upgrading their infrastructure to SWIFTNet Release 6. By end-December 2007, 94% of the live SWIFTNet FIN traffic was on SWIFTNet Phase 2. Phase 3 of the project sees the activation of the Relationship Management Application in 2008 to provide customer control over traffic received.

(1) See www.bankofengland.co.uk/publications/fsr/2007/index.htm
(2) Source: SWIFT data available at www.swift.com/index.cfm?item_id=5509.

Governance

Lazaro Campos succeeded Leonard Schrank as CEO of SWIFT in April 2007. At the SWIFT annual conference, Sibos, in October 2007, the new CEO set out a customer-centred focus. This includes a simpler, less costly interface product, new pricing models and an internal re-organisation towards a more regional structure.

The Bank is supportive of actions to enhance the engagement between SWIFT and its users. Effective governance provides incentives for management to pursue objectives in the interest of the system, its participants and the public more generally.

SWIFT's 2010 strategy implies further expansion by SWIFT. It is vital that investment in resilience continues to reflect its systemic importance.

Chapter 3: Issues and priorities for future work

As described in Chapter 1, the CPSS Core Principles form a central part of the Bank's approach to oversight. Chapter 2 describes the main developments in the key UK payment systems, based around the Core Principle assessments. However, as outlined in previous *Oversight Reports*, the static content of the Core Principles can create a gap between the benchmark which they represent and the changing risks within payment systems. Therefore, to complement the Core Principles, the Bank has developed an Oversight Risk Framework, as detailed in the 2006 *Oversight Report*.(1) The aim of the Framework is to facilitate a consistent comparison of different risk-types within a system, as well as risks across different systems. The Framework can therefore be used to help identify and assess cross-system thematic issues relevant to the Bank's risk mitigation work. This chapter focuses on some such thematic issues the Bank considers to be priorities over the coming year.

In recent years, considerable progress has been made by UK payment systems in meeting the Core Principles; so the focus of the Bank's oversight work has shifted towards considering what more needs to be done, especially for systemically important payment systems. This approach reflects the Bank's risk-based Framework which implies that risk-reducing measures undertaken should be proportionate to the systemic importance of a system. Such initiatives include the improvement of contingency arrangements likely to be invoked during low likelihood, high impact risk events.

The importance of this work was highlighted by the recent market turbulence. The UK market infrastructure generally coped well during this period. However, the turbulence did underscore the importance of adequate planning by systems and their members. These issues are explored in Section 3.1.

Section 3.2 considers business continuity more generally, focusing on issues arising from the interdependencies between different parts of the UK financial infrastructure. Greater co-ordination between systems improves contingency planning, and the Bank encourages further action in this regard.

Within the United Kingdom, the newly formed Payments Council acts as the strategic governance body for the payments industry. As such, the role of the Payments Council includes the co-ordination of cross-system contingency arrangements. An update of the work of the Payments Council, in particular with regard to the National Payments Plan, is provided in Box 3.

Previous *Oversight Reports* have stressed the benefits of communication and transparency by systems and public authorities. These ideas are explored further in Section 3.3 which describes efforts by both central banks and payment systems to improve the public disclosure of Core Principle assessments.

3.1 Impact of market turbulence on infrastructure

The UK market infrastructure generally coped well with the challenges presented by recent market turbulence, though the experience has highlighted some issues for further consideration.

As financial intermediaries and investors have sought to reposition their exposure to market and credit risks, trading volumes increased significantly in some of the more liquid financial markets during the second half of 2007. Use of automated and algorithmic trading has also played a part in increasing volumes on peak days.

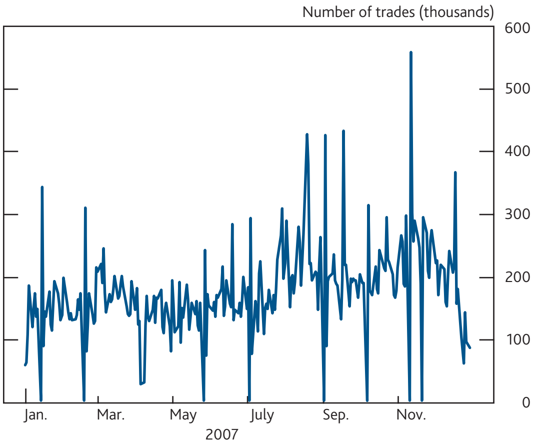
In some cases, increased market volatility caused financial institutions to face larger and more frequent margin calls from central counterparties, and higher trading volumes led to an elevated number of transactions processed by payment and settlement systems (**Charts 23, 24** and **25**).

These higher-trading volumes have tested the processing capacity of the clearing and settlement infrastructure. In 2007, CLS exceeded its previous record for daily trading volumes on 30 occasions. Twenty-seven of these occasions were in the second half of the year with particular concentrations in August and November, coinciding with episodes of market turbulence.

LCH.Clearnet Ltd's clearing of equities reached a record on 9 August 2007, and CREST's securities settlement volumes peaked on 15 August 2007. The infrastructure generally coped

(1) Bank of England (2007), *Payment Systems Oversight Report*, available at www.bankofengland.co.uk/publications/psor.

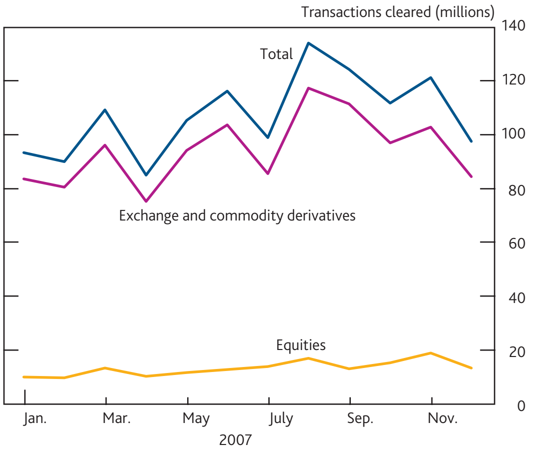
Chart 23 Daily volumes in CLS(a)(b)



Source: CLS Bank International.

(a) Volume figures report the number of trades submitted to CLS; only one side of each trade is included in this chart.
(b) CLS does not settle currencies on local public holidays. On US dollar holidays, volumes typically fall to a few hundred transactions.

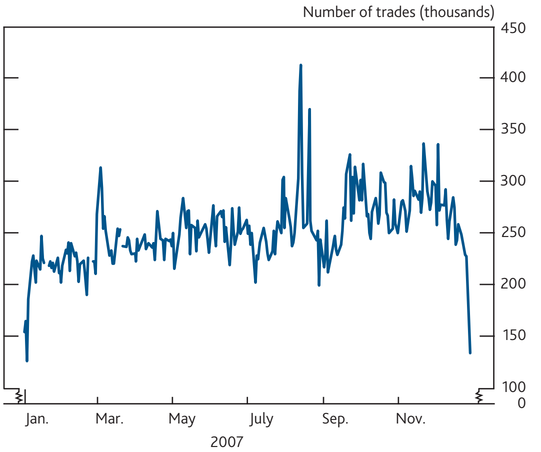
Chart 24 Monthly volumes in LCH.Clearnet Ltd(a)



Source: LCH.Clearnet Ltd.

(a) Total includes swaps and fixed income which are not shown separately as their volumes are very small.

Chart 25 Daily volumes in CREST(a)



Source: Euroclear UK & Ireland.

(a) Excluding self-collateralising repos.

well with these record volumes. For example, as described in Section 2.5, while CLS experienced a temporary capacity related problem on 16 August, it was able to manage the issues that arose without significantly affecting settlement, and subsequently was able to process even higher volumes without incident.

Infrastructure providers also worked closely with members on peak days to ease pressures by, for example, extending operating hours.

The market turbulence has given rise to several issues for payment and settlement systems and their members to consider. First, it is important for systems to undertake comprehensive planning and invest in adequate technological capacity for stressed circumstances. While capacity planning has been a long-standing focus within systems, and processing capacity was well calibrated to cope with previous peaks, recent events demonstrated just how high volumes can be, and the need for systems to stress test against more ambitious targets in future.

Second, it became clear that member behaviour, and capacity problems at individual members, can have implications for both the system itself and for interlinked systems. For example, an extension in CREST as a result of processing problems at an individual member will typically require an extension of CHAPS as well, in order for settlement banks to manage their end-of-day liquidity positions. Therefore, capacity planning is also critical for individual institutions. These capacity tests should assume extreme events over a sustained period. In addition, back-up plans to deal with extreme volumes must be well articulated and tested. Changes in the timetable or in the methods of processing transactions in times of stress may require members to change their own behaviour — for example, by being able to mobilise resources if there is an extension to settlement timetables. The Bank is also analysing (and will work with the systems on) broader issues relating to the interaction between members and systems if any face financial difficulties.

Most UK payment systems have a tiered structure, where only a limited number of banks are settlement members. For smaller banks and some overseas banks, it is typically seen as more cost-effective to become an indirect member or ‘agency’ bank, with one of the settlement banks acting as a sponsor. The turbulence highlighted potential pressures on settlement banks arising from the processing of much higher than usual values of payments on behalf of agency banks. This is true of retail as well as wholesale systems and demonstrates the importance of effective intra-day liquidity and credit risk management by settlement banks.

In stressed circumstances, settlement bank obligations on behalf of their agency banks can be significantly higher than

Box 3 A National Payments Plan for the UK payments industry

Background

The Payments Council (PC) was formed in March 2007 to play the role of a strategic governance body for the UK payments industry. Its objectives are to help foster innovation and co-operation in UK payment services, maintain their integrity and ensure that payment systems are open and accountable. The main domestic UK payment schemes have entered into a contract with the PC, which sets out a relationship based on good communication between all parties. The PC Board's decisions are binding on these payment schemes.

The National Payments Plan

The PC is developing a National Payments Plan (NPP), which has been widely consulted upon. The NPP aims to provide a strategic plan for the United Kingdom's payment systems. Once fully developed, the Plan will be periodically revised and updated, providing a framework for the development of payments in the United Kingdom over a five to ten–year horizon.

One of the sections in the NPP that the Bank is most interested in from an oversight perspective is the integrity of UK payment schemes, especially with regard to cross-system issues. Effective contingency measures need to be in place to mitigate operational and other disruptions, and hence to maintain integrity. In addition, the Bank would welcome any measures that could improve cross-system contingency arrangements, where the PC can provide a useful co-ordination role. For example, as well as bringing efficiency and competition benefits, payment message standardisation could facilitate re-routing of payments. Harmonised contingency planning could also be beneficial.

There is considerable focus in the NPP on retail payments, where the main recent trends have been declining transaction volumes for cheques and, to a lesser extent, cash. Various forms of electronic payments are being used more often by users as substitutes, explaining part of their significant growth in volumes. If, as forecast by the PC, cheque volumes continue to decline, it is possible cheques could be discontinued in the United Kingdom at some point. A key issue in the consultation is whether to let the market determine the rate of cheque decline or to phase out cheques in a more proactive manner. The PC is minded to pursue the latter approach, whilst stressing the need for suitable substitutes to exist for all current cheque uses.

A number of other issues are also discussed in the NPP, including innovation, financial inclusion and efficiency.

Special Investigation into the needs of wholesale payments users

In addition to the NPP, the PC is currently conducting a Special Investigation into the needs of wholesale payments users. This is relevant to the future form of the CHAPS high-value payment system. In the future, a large proportion of low-value CHAPS traffic is expected to migrate to Faster Payments (see Section 2.1). Consequently the future optimal design and operation of the system may be considerably different to the current system.

Next steps

The deadline for responses to both the NPP and Special Investigation closed on 4 February 2008. A combined document covering both consultations is expected to be published in Spring 2008.

payments made on their own account. Likewise, a risk arises for agency banks that, should their settlement bank fail, the agency bank would be unable to effect payments for a period of time. It is proposed in the consultation document *Financial stability and depositor protection — strengthening the framework*[1] that agency banks should therefore ensure appropriate contingency arrangements have been developed and agreed with at least one other settlement bank to mitigate this risk.

3.2 Business continuity

The message from Chapter 2 and Section 3.1 is that UK payment systems have remained inherently robust, including during the market turbulence of the second half of 2007. Payment systems continue to mitigate high impact operational risk through contingency arrangements and business continuity planning. In addition, market infrastructures have strong and growing dependence on common service providers and this needs to be recognised in any planning and testing they undertake. Whilst the likelihood of these operational risk events is low, it is critical that such measures are tested regularly to provide assurances that they will operate as expected in a stressed scenario.

All systems have devoted a considerable amount of time to business continuity testing in 2007, and work has progressed in a number of areas. In addition to the system's own tests, there has been an increased emphasis on testing with members. For example, SWIFT ran two exercises in 2007; a test of its disaster recovery capability, and an Operating Centre recovery test. EUI tested its recycle mode procedures with its settlement banks and CHAPS carried out several exercises,

(1) The consultation document *Financial stability and depositor protection: strengthening the framework* is available at www.bankofengland.co.uk/publications/other/financialstability/consultations.htm.

including co-ordinated testing of payment submissions from secondary sites and testing of fax-based procedures (both detailed in Section 2.1). The Bank has continued to place considerable emphasis on the importance of member participation in regular and well-planned testing. This includes participating in testing organised by payment service and other utility providers.

The Tripartite Resilience Benchmarking Project, first undertaken in 2005,[(1)] was repeated at the end of 2007 and the FSA expect to publish the results in April 2008. Several of the UK payments systems participated. The 2005 Project reported that the set of IT risk controls and procedures employed in most payment systems compared favourably with best practice within the wider financial services industry.

Infrastructure interdependencies

As outlined in Chapter 2, the contingency plans of UK payment systems are thorough and subject to a large amount of testing. However, it is also important that contingency arrangements between payment systems, and indeed between exchanges, clearing houses and securities settlement systems, are well developed too.

While individual payment systems may be robust, the Bank, working alongside the Payments Council, the systems and their members, will also need to analyse and prepare for what would happen if one of the systems was inoperable for an extended period. One option to cope with a long outage may be for banks to re-route the payments they would have made via the inoperable system into one that is functioning. For example, if banks were unable to make payments for several days in CHAPS, an alternative might be to process them through Bacs.

However, discussion with several of the key players involved in payment systems suggests that such re-routing is unlikely to be quick or straightforward. Banks' internal systems for processing different types of payments have generally been constructed separately, without any standardisation, so a large amount of manual processing is required to divert one type of payment into the system designed for another. Given the large number of payments made on a daily basis in each system, this level of manual intervention is likely to be too time consuming at present to be feasible for significant volumes of payments over a prolonged period. Processing a large number of payments manually may also give rise to a greater degree of operational error than usual.

The Bank believes that this area is one that would benefit from central co-ordination of ideas and looks to the Payments Council to provide this over the course of 2008.

Greater co-ordination between those systems which process a transaction at various stages in its lifecycle — exchanges, clearing houses, settlement systems and payment systems — would also be beneficial. This was highlighted, for example, in the UK Market Wide Exercise at the end of 2006 using a pandemic influenza scenario. In this scenario, it became clear that if one of the major parts of the infrastructure became inoperable for a few days, there was some uncertainty over how the rest of the market and other infrastructures would react.

Following the pandemic influenza exercise, the Cross Market Business Continuity Group (CMBCG),[(2)] together with Bank of England overseers and FSA supervisors, have been working with the London Stock Exchange, LCH.Clearnet Ltd and Euroclear UK & Ireland Ltd, and with LIFFE and LCH.Clearnet Ltd, to improve crisis co-ordination between the infrastructure providers. Each system has been developing procedures they would implement in the event of an outage of the other, to ensure as far as possible that payments could continue to be processed. The views from the principal banks and securities houses in the United Kingdom are also being elicited since they will need to confirm that they can adhere to any operational contingency arrangements before any final plans are agreed. These plans will then become part of the rulebooks and contingency procedures of the infrastructures concerned, and would be used as reference by the CMBCG in any co-ordinated recommendations it makes during a crisis.

Finally, it is important that cross-border co-operation on business continuity is strong, so that incidents which affect infrastructures that span different jurisdictions and timezones can be managed effectively. The CPSS, which contributes to the strengthening of the international financial market infrastructure through promoting sound and efficient payment and settlement systems, has also been examining how increasing interdependencies across payment and settlement systems affect the way in which firms and systems manage risk. A report is due to be published in 2008.

3.3 Standards and transparency

Previous *Oversight Reports* have acknowledged the importance of transparency as a tool for promoting financial stability.

The Core Principles provide a foundation for transparency, in that they set out publicly the standards that central banks expect systemically important payment systems to meet. The Core Principles, and the CPSS-IOSCO Recommendations for Securities Settlement Systems (SSSs) and Central Counterparties, have been adopted widely by central banks; the Core Principles and the Recommendations for SSSs are also used within the IMF/World Bank *Financial Sector*

(1) For more information see www.fsc.gov.uk/section.asp?catid=320&docid=942.
(2) The CMBCG was set up in 2005 to help co-ordinate market responses to operational disruptions. See www.fsc.gov.uk/upload/public/Files/10/cmbcgtor1.pdf.

Assessment Program in the assessment of member countries' payment and settlement infrastructure. In recognition of this widespread application, the CPSS has recently set up a Working Group to review guidance on the interpretation and implementation of these CPSS-related standards, based on the experiences of central banks.

SWIFT is not subject to the Core Principles or CPSS-IOSCO Recommendations. However, as mentioned in section 2.10, the National Bank of Belgium published High Level Expectations (HLEs) for SWIFT oversight in 2007. The HLEs set out objectives that overseers expect SWIFT to meet, and emphasise the importance that central banks attach to the smooth functioning of SWIFT.

Public disclosure by central banks, other authorities and payment systems

Transparency of oversight is supported by the Bank, both in terms of central banks disclosing their Core Principle assessments of systemically important payment systems; and in terms of system operators themselves disclosing information on the degree of their systems' compliance with the Core Principles. Further progress has been made in both these aspects.

Public disclosure of assessments of compliance with the relevant Core Principles promotes awareness and understanding of potential risks arising in payment systems among users, improving market discipline. Ultimately, greater disclosure has the potential to strengthen public confidence in the relevant payment systems, or to alert users to any potential weaknesses. In addition, enhanced transparency improves central bank accountability by providing a public benchmark.

A number of central banks currently publish reports or articles outlining oversight activity, and their corresponding assessments of local payment systems against the Core Principles. Other central banks publish *ad-hoc* assessments of systems. The Bank welcomes this activity, and would encourage others to follow suit.

As noted above, the IMF and World Bank also conduct assessments of payment systems against the Core Principles, and of securities settlement systems against the CPSS-IOSCO Recommendations; publication of these assessments is optional for the country concerned.

Some systems have decided to undertake self assessments against the relevant standards and in some cases have published those assessments.

As reported in the previous *Oversight Report*, the Board of Governors of the Federal Reserve System (the Board) has revised its *Policy on Payments System Risk*.(1) Among other things, this establishes an expectation that operators of systemically important payment and settlement systems subject to the Board's authority will publicly disclose their self-assessments against relevant standards. By 31 December 2007, self-assessments had been published for the Fedwire Funds and Fedwire Securities Services (available on the Federal Reserve Board's website), CHIPS, CLS and DTC (available on the systems' respective websites). The Board expects these initial self-assessments to be updated where necessary, following material changes to a system or its environment, with systems expected to review their self-assessment every two years at a minimum to ensure continued accuracy.

Importantly, the Board intends to review the published self-assessments of systems under its authority and, where necessary, provide feedback to system operators.(2) Where the Board materially disagrees with the content of a self-assessment its concerns will, where appropriate, be communicated to the system's senior management and possibly the system's board of directors. The Federal Reserve may also discuss any concerns with other relevant authorities.

(1) Available at www.federalreserve.gov/newsevents/press/other/other20070112a1.pdf.
(2) As indicated in the Board's policy, any review of an assessment by the Federal Reserve should not be viewed as an approval or guarantee of the accuracy of a system's self-assessment, and the contents of any review would be subject to the Board's rules regarding disclosure of confidential supervisory information.

Glossary of terms

Business risk
The risk that the payment system or any of its components — for example, an infrastructure provider serving it — cannot be maintained as a going concern in the face of adverse financial shocks.

Central counterparty
An entity that interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer. This allows buyers and sellers to manage counterparty credit risk. The central counterparty normally protects itself against credit risk by levying margins on participants.

Core Principles
The ten Core Principles for Systemically Important Payment Systems provide a set of minimum standards for risk management in systemically important payment systems.

Deferred net settlement
Under deferred net settlement, a payment system releases details of payments to the receiving bank prior to interbank settlement. Settlement is achieved when (bilateral or multilateral) net obligations are posted to accounts at the settlement agent, and so participants need to generate liquidity only equal to their net obligations.

Designation
Designation under the SFD/FMIRs provides additional assurance of the enforceability of a system's default arrangements.

Exposure
The maximum loss that might be incurred if assets or off balance sheet positions are realised, or if a counterparty (or group of connected counterparties) fails to meet its financial obligations.

Financial Markets and Insolvency (Settlement Finality) Regulations
These Regulations — 1999 (SI 1999/2979) (FMIRs) — implement into UK law the EU Settlement Finality Directive.

Governance
Corporate governance is the method by which an organisation is directed, administered or controlled. The corporate governance structure specifies the distribution of rights and responsibilities of the board, managers, any shareholders and other stakeholders, and spells out the rules and procedures for managing decisions on organisational affairs.

Legal risk
The risk that unexpected interpretation of the law, or legal uncertainty, leaves payment system participants and users with unforeseen financial exposures and possible losses.

Operational risk
The risk that a system operator or core infrastructure provider to the system is operationally unable to process or settle payments as intended.

Principal risk
The risk that one party loses (up to) the full value of the trade if it satisfies its obligation but the other party does not.

Settlement Finality Directive
The EU Directive on Settlement Finality in Payment and Securities Settlement Systems (Directive 98/26/EC); implemented into UK law by the FMIRs.

Settlement risk
The risk that a participant in a system cannot or does not meet its financial obligations when, under the rules of the system, they fall due, or that another institution that facilitates the settlement of those obligations — such as the settlement agent — becomes insolvent.

Abbreviations

APACS – Association for Payment Clearing Services
ATM – Automated teller machine
BABs – Bacs Approved Bureaux
BPSL – Bacs Payment Schemes Ltd
BIS – Bank for International Settlements
C&CC – Cheque and Credit Clearings
C&CCC – Cheque and Credit Clearing Company Ltd
CBFSAI – Central Bank and Financial Services Authority of Ireland
CCP – Central counterparty
CHAPS – Clearing House Automated Payment System
CHAPSCo – CHAPS Clearing Company Ltd
CHIPS – Clearing House Interbank Payment System
CLS – Continuous Linked Settlement
CMA – Cash Memorandum Account
CMBCG – Cross Market Business Continuity Group
CPSS – Committee on Payment and Settlement Systems
CRESTCo – CREST Company Ltd
CWG – Cheque Working Group
DBR – Delivery by Value return
DBV – Delivery by Value
DTC – Depository Trust Company
DTCC – Depository Trust & Clearing Corporation
DvP – Delivery versus Payment
ECB – European Central Bank
ESA – Euroclear SA/NV
EUI – Euroclear UK & Ireland Ltd
FMIRs – Financial Markets and Insolvency (Finality) Settlement Regulations
FSA – Financial Services Authority
FTS – Funds Transfer Sharing
FXSR – Foreign exchange settlement risk
GDP – Gross domestic product
HLEs – High Level Expectations
HST – High speed transmission
ICE – IntercontinentalExchange
IOSCO – International Organization of Securities Commissions
I/O swap – Inside/outside swap
IMF – International Monetary Fund
LFCA – Liquidity Funding and Collateralisation Agreement
LSE – London Stock Exchange
MoU – Memorandum/memoranda of Understanding
NPP – National Payments Plan
OFT – Office of Fair Trading
OMO – Open market operation
OTC – Over the counter
PIN – Personal identification number
PPS – Protected Payments System
PvP – Payment versus Payment
RTGS – Real-Time Gross Settlement
SAS70 – Statement on Auditing Standards number 70
SCR – Self Collateralising Repo
SEPA – Single Euro Payments Area
SFD – Settlement Finality Directive
SLA – service level agreement
SSE – Single Settlement Engine
SSS – Securities Settlement System
STS – SWIFTNet transmission service
SWIFT – Society for Worldwide Interbank Financial Telecommunication
TARGET – Trans-European Automated Real-Time Gross Settlement Express Transfer
TARGET2 – Trans-European Automated Real-Time Gross Settlement Express Transfer 2

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