



BANK OF ENGLAND

Speech

The case for more CHAPS settlement banks

Speech given by

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It is a pleasure to be here this morning to address the Yorkshire and Humberside Network of the ifs School of Finance. My colleague, Paul Fisher, is the Chairman of the Board of Governors of the School. I share Paul's view that the School's remit to provide the financial services industry with a skilled and competent workforce whilst also promoting a better understanding of finance amongst consumers, will be more relevant than ever over the coming years as the financial system repairs and, hopefully, as confidence and trust in the system restores.

My focus today is on the high value payment systems which sit at the heart of the UK banking system, CHAPS and CREST.

The CHAPS payment scheme is designed for making instant, high-value sterling transfers and is one of the most systemically important payment systems in the UK. Typically, you and I will initiate a payment using CHAPS only rarely, for example when buying a house. But financial institutions will make many large CHAPS transactions every day, regularly settling inter-bank loans worth hundreds of millions of pounds. It settles payments worth £250bn on an average day and 40 times the value of UK GDP over a year. The CREST system plays an equivalent role for securities transactions and is used intensively by financial institutions for the exchange of loaned funds and associated collateral.

Systems such as CHAPS and CREST have a low profile yet as Alan Greenspan remarked about the US,¹

"We'd always thought that if you wanted to cripple the US economy, you'd take out the payment systems. Banks would be forced to fall back on inefficient physical transfers of money. Businesses would resort to barter and IOUs; the level of economic activity across the country would drop like a rock."

My main aim this morning is to explain why the Bank believes that the currently rather limited direct membership of CHAPS should expand. I will also summarise a number of technical reforms that the Bank is championing, which will reduce the amount of intraday lending by the Bank to the CHAPS and CREST member banks. These reforms will also have financial stability benefits. But before doing so I want to reflect briefly on the key design features of CHAPS and CREST, and why those features enabled the payment systems to operate reliably during the recent crisis. This provides context for explaining the changes which the Bank would like to see.

Precisely because the key payment systems are so important, banks, system operators and their overseers go to great lengths to ensure their safety. For example, they typically settle in the safest asset possible – central bank money – giving banks confidence that their exposure to a transaction is permanently extinguished when payment is received into their central bank account. If, conversely, settlement occurred across the books of a commercial bank, the payment recipient would retain an exposure to the commercial

¹Greenspan, A (2007), 'The Age of Turbulence, Adventures in a New World', *Penguin Press*, New York

bank in question.² In the UK, settlement at the Bank of England dates back well over a hundred and fifty years.

In recent times, the key change to CHAPS has been the shift to a real time gross settlement (RTGS) method for transferring funds between banks. Prior to RTGS, CHAPS payments were settled on an end of day net basis when all the individual movements between the settlement banks were netted together and settled as one. The risk was that if a settlement bank was unable to meet its end of day net payment obligation, funds that the other banks had been expecting would not have materialised. So banks could have been left short of funds that they had treated as being already theirs and which, on some occasions, they had made available to customers in anticipation. Under RTGS, which CHAPS adopted in 1996, individual payments are settled across the settlement banks' accounts throughout the day, in real-time. Banks know exactly what they have and, equally importantly, what they don't have, eliminating the uncertainty that had previously existed.

This development was not unique to the UK, but was part of a wider, global initiative recognising the considerable risk-reduction that real-time gross settlement could bring, which saw similar systems established in all but one of the G-10 countries by 1998.³

Simplifying slightly, prior to RTGS the settlement banks had in effect lent and borrowed from each other intraday, unsecured, settling on a net basis at the end of the day. That practice ceased with RTGS, creating an intraday funding need to bridge between the gross payments in and out. The solution, which facilitated the adoption of RTGS here and overseas, was for central banks to provide freely intraday credit, or liquidity, but secured against high-quality assets.⁴

The move to RTGS for cash payments was mirrored in the main securities settlement systems. In the UK, CREST was reformed in 2001 to operate according to a model of "Delivery versus Payment" in which securities and associated payments were exchanged simultaneously, with settlement in central bank money being made in RTGS. Again this eliminated credit risk – in this case, the risk that a counterparty might default after the securities had been transferred but before they had been paid for – and represented another significant step forward in securing the robustness of the UK payments infrastructure.

The vital importance of a resilient payment system was never more evident than in the autumn of 2008. In the aftermath of Lehman Brothers' bankruptcy, banks became increasingly reluctant to deal with each other, with even overnight money markets edging towards closure. In such a climate, banks would have been

² Committee on Payment and Settlement Systems (2001), 'Core Principles for Systemically Important Payment Systems', Bank for International Settlements.

³ See the 1990 Report of the Committee on Interbank Netting Schemes of the central banks of the Group of Ten countries (the 'Lamfalussy report') available at <http://www.bis.org/publ/cpss04.htm> and the 1997 Report on Real Time Gross Settlement systems available at <http://www.bis.org/publ/cpss22.htm>

⁴ In the UK's case, those assets are also the assets eligible in the Overnight Standing Facilities, such that if a bank could not repay its end of day borrowing for an operational reason it would be possible at the Bank's discretion to roll the intraday borrowing into the Overnight Standing Facilities.

extremely unwilling to engage in any activity that risked them developing an intraday exposure to banks which could have been on the brink of collapse. But in the absence of RTGS and DvP, many transactions could have entailed such a risk. Without these crucial developments, the payment system could have frozen up entirely. Instead, as risk appetites diminished sharply and the terms of loans shrunk, the daily value flowing through the payment system grew. Until mid-September 2008, the maximum daily value ever settled by DvP was £450bn. Within just over a month, the £450bn peak was exceeded 11 times, 5 successive new records were set, and average values climbed by almost £80bn. In mid-January, a new peak of £629bn was hit: a record which stands to this day and was nearly twice the pre-crisis 2008 average⁵. Any faltering of the CHAPS or CREST system during a time of such immense pressure could have greatly exacerbated the crisis; it is thanks to the series of reforms bolstering their resilience that this was avoided.

We should be grateful therefore to all of those who championed the cause of moving to RTGS in the 1990s: a difficult to implement reform which took years to achieve. But it is important to remember that these changes only affected the means of settlement between the direct members of each payment system, and this takes me on the central issue I want to discuss this morning: the case for greater direct membership of CHAPS.

In large value payment systems, banks can participate either directly or indirectly. If they participate indirectly, then they will make use of a correspondent bank. The correspondent will be a direct member of the payment system and will submit and receive payments on behalf of its customer, with the consequent obligations between the correspondent and its customer typically settled by the end of the day.

Access patterns to high-value payment systems vary widely across currency areas; there has been no convergence in practices to match the move to the RTGS technology. Sterling sits at one end of the spectrum, with indirect membership the norm: there are only 18 direct members of CHAPS for sterling payments.⁶ At the other end of the spectrum is Hong Kong, where all licensed banks are required to be direct participants of the Hong Kong dollar high value payment system. Membership of other high value systems typically sits somewhere between these extremes — for example Fedwire has over seven thousand direct participants, accounting for most of credit institutions in the US. In the parlance of payment systems, membership of CHAPS is highly tiered, whereas the membership of the HK system is not at all tiered.⁷

The diversity reflects, in part, the different ways in which national payment systems have evolved: in the United Kingdom's case, the lingering after-effects of the interaction of the development of a basic payments infrastructure in London during the 18th century and regulatory restrictions on joint-stock banking which

⁵ Figures refer to final exchanges of value across settlement accounts at the Bank of England.

⁶ And this includes two banks that are part of other settlement banking groups as well as the Bank of England and CLS, the foreign exchange settlement system.

⁷ The level of tiering is defined as the ratio of direct participants to all banks that make payments via the system. A high value indicates a low level of tiering, whereas a low value indicates a high level of tiering.

remained in place until the 19th century.⁸ It is also symptomatic of the lack of any international consensus on the optimal trade-off between direct and indirect membership to drive convergence to a particular model.

What then are the costs of having indirectly settled payments?

Perhaps most important, intraday credit risk is re-introduced. Customer payments are made by the correspondent bank using its own liquidity, which often leads to unsecured lending to the customer until accounts are squared at the end of the day. This exposes the settlement bank to credit risk because it is ultimately responsible for the payments, whether or not the customer meets its obligation to pay at the end of the day. Alternatively, if a settlement bank has received in more payments for a customer than it has paid out, the customer bank has an unsecured credit exposure until those funds are credited to it.

Where a customer is larger than its correspondent, these credit risks can become material enough to threaten the correspondent. This risk nearly materialised during the financial crisis, where in one of the UK payment systems, a UK bank that got into difficulty made its payments through a much smaller bank, in terms of balance sheet size. These exposures could well have put the smaller bank in significant financial difficulty had the authorities not intervened in the failing bank.

Precisely because of this type of risk, correspondent banks are likely to seek additional protection during periods of stress, in particular by asking for previously uncollateralised lines to become collateralised. This could happen at very short notice, acting as an adverse liquidity shock to affected customer banks. To take a famous case, this happened to Lehman Brothers. In the weeks leading up to its bankruptcy, its correspondents from around the world called for a total of \$16 billion of collateral and prefunding. This was a significant drain on Lehman's liquid asset pool, which had not been calibrated to take into account this possibility, contributing materially to the speed of its demise.⁹

Finally, customer banks may be completely operationally reliant on their correspondent to make payments and settle trades. Were a correspondent to have operational issues, or *in extremis* to default, this would disrupt its customers' payment flows. This loss of control over operational risk could be a significant cost of participating as an indirect member.

⁸ By the mid 17th Century, goldsmiths in London carried out a banking business, creating money and accepting each other's notes. Settlement between the goldsmiths happened bilaterally; bank clerks met to exchange notes and differences were settled in *specie*. These arrangements were formalised by 1770, when the Walk Clerks (as they became known) started meeting in the Five Bells on Lombard Street to settle everything in one location. In 1833 a purpose built Clearing House was constructed and the freehold was purchased by 39 member banks in 1834. When, in 1895, the organisation became a private company, the Bankers' Clearing House Limited, bankruptcies and mergers meant that only four members remained. On the regulatory side, until 1826, the Bank of England had a nationwide monopoly on joint-stock banking. This served to prevent other banks from expanding greatly in size and meant that they focused on serving local needs. But these banks – notably, the so-called 'country banks' – needed to have a London correspondent account in order to settle payments with banks in London and the other regions. See Norman, B, Shaw, R and Speight, G (2011), 'The history of interbank settlement arrangements: exploring central banks' role in the payment system', *Bank of England Working Paper no. 414* for a more in-depth history of settlement arrangements and Matthews, P (1921), *The bankers' clearing house, Sir Issac Pitman & Sons Ltd*, London for a history of the Bankers' Clearing House

⁹ Valukas, A (2010), 'Lehman Brothers Holdings Inc. Chapter 11 proceedings Examiner's report', *Jenner & Block*, March.

At its most general, a customer bank makes itself reliant on its correspondent: if that correspondent gets into difficulty, for either credit or operational reasons, the customer bank could be imperilled. Indeed, during the Great Depression, 247 US banks were closed between Jan 1929 and Mar 1933 due to the failure of a correspondent. And to give a more local, if not so recent example, in 1812, "...the bankruptcy of the London house of Messrs. Boldero & Lushington with twelve [customers]...pulled down its Leeds [customer], Messrs Fenton, Scott, Nicholson & Smith and created serious difficulties for others such as Messrs Townend & Rishworth of Wakefield and Pease & Co. of Hull...(Pressnell 1946, pp. 469-470)".¹⁰

The primary impact of these risks is upon the correspondent banks and their customers. But there are also spill-over risks. For example, uncertainty about the exposure a settlement bank has to a customer in difficulty could lead other banks to delay payments to the correspondent, amplifying the disruption.

Set against this, there are some benefits from having indirect members. First, membership of a payments system can be costly financially and in terms of know-how, potentially prohibitively so for small banks. This seems a material consideration, for example, for many of the UK's small banks and building societies. There can be financial and informational economies of scale from concentrating membership. Second, RTGS systems require a degree of cooperative behaviour: there is an in-built incentive with real time settlement to delay one's payments to the end of day in the hope of receiving others' payments early. But if everyone in the payments scheme adopted such an approach, then all transactions would shift to the end of the day, a self defeating outcome which would simply elevate operational risk (a bunching of payments near the end of the day increases the value and volume of activity at risk from an unresolved operational outage). This is a feature of Fedwire in the US, where the majority of payments are typically made after 3pm each day. In theory, limited direct membership should make it easier to cooperate, such that payments are made throughout the day,¹¹ and in practice such behaviours are evident by the CHAPS banks. Finally, because use of correspondents concentrates payments through a smaller number of banks, each of those banks is better able to coordinate incoming and outgoing flows. This coordination makes settlement more efficient, reducing the amount of liquidity that is needed for each pound or dollar of payment that is settled.

In principle, there could be too little as well as too much tiering and a balance must be struck between the costs and benefits for individual banks and for the system. At some point, the complexity of a payment system with many members could outweigh the risk reduction benefits from adding more banks.

However, the case is clear for CHAPS. Just 18 direct members serve the entire sterling banking industry. Over 50% of CHAPS payments are made by correspondent banks on behalf of customer banks, implying

¹⁰ James, Prof. J, University of Virginia, 'Correspondent Banking and Payments System Disruptions in England through 1825' Unpublished Manuscript. (Terminology adjusted to bring in line with that used here).

¹¹ This has much in common with the Volunteer's dilemma which describes a situation whereby a volunteer is needed to sacrifice itself so that an entire group can benefit. The Volunteer's dilemma predicts that in smaller groups individuals are more likely to act for the common good, in payment systems this means making payments early and providing liquidity to the system which is important for the smooth running of the system. (Diekmann, A (1985), 'Volunteer's dilemma', *Journal of Conflict Resolution*, Vol. 29, No. 4, pages 605-10 shows that as group size increases, individual members are less willing to volunteer and therefore more likely to free ride on the liquidity provision of others).

that those payments are subject to the risks outlined above. Moreover, the risks that some banks are running to provide intraday liquidity are very large: the Bank estimates that some intraday credit lines are in excess of 10% of the correspondent bank's core tier 1 capital.

The Bank believes that excessive tiering in the UK payment systems introduces unnecessary risk and change is needed. That is also likely to be a conclusion of the IMF in their 2011 Financial Sector Assessment Programme. The experience of the financial crisis, in particular the case of Lehman Brothers, has added further evidence for the case for change and two major banks, appearing to have drawn this conclusion for themselves, have become direct members of CHAPS since the crisis.

As it happens, CHAPS membership would not need to expand by much to go a long way to meeting the Bank's concerns. Adding the five largest second tier banks would reduce indirect participant flows by about a quarter. Adding the 10 largest second tier banks would lead to reduction in indirect flows of more than a third. And if settlement banks were additionally to rationalise their own affairs so that all of their payments were made through their own settlement account, then only around a quarter of CHAPS payments would be made via a correspondent banking relationship. Changes of this magnitude should not be extensive enough to realise the potential costs of increased direct membership outlined above.

In the first instance the Bank will engage with the correspondent and the customer banks directly, together with their respective supervisors at the FSA, to encourage the change we want to see. But if membership does not increase, and tiering continues to be a significant issue for the UK, the Bank may consider recourse to more formal actions. Essentially, the wholesale payment systems have a responsibility to ensure that their members can cope with their payments business. That needs to be reflected in their rules.

More generally, perhaps in light of lessons from crisis, there is now more international debate about the risks associated with highly-tiered payment systems. Draft new principles for payment systems and other financial market infrastructures, published by the Basel Committee on Payment and Settlement Systems and International Organisation of Securities Commissions identify the need to mitigate the risk of tiered participation as a key requirement. The Bank strongly supports this requirement.

Before I move on to the other, technical, changes to the schemes that the Bank is championing, I will explain a little more about the operation of the CHAPS and CREST systems. As I stated earlier, RTGS considerably increased the intraday liquidity demands on the settlement banks. At the inception of RTGS, the Bank decided to allow the settlement banks access to plentiful intraday liquidity, to facilitate the use of the new RTGS system. To minimise the opportunity cost of this intraday borrowing, settlement banks were allowed to pledge as collateral intraday the same low-risk securities which they were required by the regulators to hold in their liquid asset buffers at close of business (a practice known as "double duty"). And as well as making intraday credit essentially free, the Bank made it extremely accessible: in the case of securities settlement in CREST, credit was provided to banks automatically in response to certain asset purchases,

regardless of whether they needed additional funds or not. As a consequence, the supply of liquidity has often been far greater than actually necessary.

These introductory measures were appropriate when RTGS was being established, to ease the transition to a safer model of payments settlement. But the measures carried risks with them.

The problem with “double duty” is that allowing settlement banks to use securities in their regulatory stock of liquid assets – designed to act as a liquidity buffer to fund *day-to-day* outflows in times of stress – to fund their *intraday* payments activity fails to recognise that one set of assets cannot cover two different shortfalls if they both materialise at once. But this is exactly what is likely to happen at times of financial stress. In future, the FSA will require settlement banks to account specifically for their intraday liquidity needs in the size of their liquid asset buffers.

Because removing double duty will make intraday liquidity more expensive, there is a possibility that banks may try to economise on it. One way they might try do this would be to delay their payments in wait of receipts and engage in the sort of uncooperative behaviour that I described earlier. This is clearly undesirable from a financial stability point of view.

As for the over-supply of intraday liquidity, the extension of any credit by the Bank clearly brings risk onto its balance sheet (which is currently around 50% larger during the day than it is overnight). While such credit is collateralised by high quality assets with prudent haircuts, there is always a small residual risk that at times of stress market prices will move by exceptional amounts, even higher than allowed for in those haircuts; in those circumstances the Bank may not be able to recover the full value of a loan in the event of a counterparty default. And if, at times of stress, an intraday loan should have to be converted into overnight lending, this would impact on the aggregate value of reserves held by banks, which the Bank would need to manage via its Sterling Monetary Framework operations.

Turning to the reforms, in relation to the risk of delayed payments, the Bank is working with the CHAPS settlement banks to implement a liquidity savings mechanism (LSM) into RTGS.¹² This will enable some of a bank’s incoming and outgoing payments to be settled simultaneously in full, while requiring only the net amount of liquidity. The introduction of an LSM should reduce the incentive to delay and create incentives for early settlement. If nevertheless, after the introduction of LSMs, payment delays became more common as banks respond to the changed regulatory environment, the Bank would investigate other options to disincentivise such behaviour.

Although the risks to the Bank from the provision of intraday liquidity are judged to be small, it is prudent balance sheet management to seek to minimise the amount of intraday liquidity created as far as is practical without impeding the efficient settlement of payments. To that end, we are working with the operator of

¹²Norman, B, (2010), ‘Liquidity saving in real-time gross settlement systems – an overview’, *Financial Stability Paper no. 7*

CREST to modify the system so that intraday liquidity for securities settlement is extended only when necessary.

Finally, and slightly separately, the Bank is supportive of efforts to modify the centralised settlement of collateralised loans in CREST, so instead of the previous arrangement, which saw the deal winding and unwinding every day, settlement simply occurs at the start of the deal and unwinds at the end. This will reduce demand for intraday liquidity from the settlement banks, which in turn reduces the intraday expansion of the Bank's balance sheet and the associated operational risks. As such, I encourage market participants to embrace the new CREST "Term DBV" product which went live just over a week ago.

To conclude, the payments infrastructure proved resilient during the crisis. In no small part this was a dividend from the efforts invested in the 1990s to introduce real time settlement into those systems. But the Bank has long held the view that extensive indirect membership means that the UK payments infrastructure is not as robust as it could be, a perspective which has been reinforced by the lessons of the financial crisis. The Bank is actively working to address this issue.