



BANK OF ENGLAND

RTGS operating hours review

November 2014

Executive Summary

1. As settlement agent for the main sterling payment systems, the Bank of England operates the UK's Real Time Gross Settlement infrastructure (RTGS). This infrastructure provides settlement in central bank money for the interbank obligations arising in sterling payment and securities settlement systems.
2. For the last decade, RTGS has settled interbank obligations from 05:45 to 16:20 on business days. In November 2013, the Bank's Executive Director for Banking Services, Chris Salmon, announced that the Bank would review its RTGS operating hours.¹ The Bank has now completed that review.
3. **The Bank has decided that it will operate RTGS for around two hours later each business day in order to enable a longer CHAPS and CREST settlement day.**
4. **This change will broadly align the UK high-value payment and securities settlement day with typical business hours, an alignment that already exists in other major economies. As a result, end-users of CHAPS and CREST will be able to settle transactions later in their business day. This could enable them to reduce risks or manage their balance sheets and payments more flexibly.**
5. **To deliver these benefits through to end-users, the Bank expects settlement banks to set later instruction deadlines for their customers that match the extension to RTGS hours.**
6. This paper describes the Bank's review process and explains its conclusions. It is aimed at institutions that participate directly and indirectly in the main sterling payment and securities settlement systems.
7. **As a next step, the Bank requests that the two system operators – CHAPS Co and Euroclear UK & Ireland (EUI) – engage with users of their systems on the detail of how and when these changes to the settlement day should be implemented and jointly recommend a solution to the Bank by end-January 2015.** The Bank suggests that implementation in autumn 2015 is used as a planning assumption. The Bank anticipates that the outcome of this engagement will be announced to participants in March 2015.
8. In addition, the Bank has concluded that, under the current market structure of the sterling retail payment systems, there are no strong drivers to settle retail systems' net interbank obligations beyond current RTGS operating hours. Unlike in CHAPS and CREST, where interbank obligations are settled across RTGS in real-time, the retail payment systems do not require RTGS to be open to exchange customer payment instructions, and some of the sterling retail payment systems already provide 24/7 payment services to customers.
9. The review of RTGS operating hours was conducted based on the current market structure of UK payment systems. If this were to change significantly in the future, the Bank would reconsider RTGS operating hours accordingly.

¹ <http://www.bankofengland.co.uk/publications/Documents/speeches/2013/speech691.pdf>

A. Background

10. The RTGS infrastructure is the system through which the Bank of England fulfils its role as settlement agent for the main sterling payment systems. It enables direct participants in these systems to settle interbank obligations in central bank money. The frequency with which interbank obligations are settled in RTGS varies between payment systems: some settle on a real-time basis, others on a deferred-net basis.

11. The Bank has two motivations for reviewing the operating hours of the RTGS infrastructure. First, it is good practice to periodically review whether RTGS operating hours meet the needs of the various markets that ultimately require RTGS to settle interbank obligations. In recent years, a number of other central banks have lengthened their RTGS operating hours, most obviously driven by the demands of the internationally-harmonised CLS cash settlement window. Second, the question of operating RTGS for additional hours was brought into particular focus in 2013 during the design stages of changes to mitigate settlement risk in two sterling retail payment systems, Bacs and FPS² – specifically, whether Bacs and FPS participants required access to their accounts within RTGS for a greater part of the day.

12. In conducting a review of RTGS operating hours, the Bank's objective was to assess whether additional RTGS operating hours would enable beneficial change in payment and settlement systems that would mitigate risk or provide benefits to end-users.

13. This paper summarises the findings and conclusions of the Bank's review of RTGS operating hours. The remainder of this section provides background on the scope of the review and describes how the review was undertaken. Section B summarises the Bank's findings regarding the CHAPS and CREST payment systems, and Section C summarises findings relating to the sterling retail payment systems. Section D outlines the Bank's proposal to change RTGS operating hours and details next steps.

Scope of review

14. The distinction between payment 'clearing' and interbank 'settlement' is important in understanding the scope of the Bank's review. 'Clearing' is the exchange of payment instructions between the direct participants of a payment system. This exchange of payment instructions creates interbank obligations which are then 'settled' across the direct participants' accounts at the payment system's settlement agent. The Bank of England is settlement agent for the main sterling payment systems, and interbank obligations arising in these systems are settled across accounts held in its RTGS infrastructure.

15. In two of the payment systems for which the Bank of England is settlement agent – CHAPS (the UK's high-value payment system) and CREST (the UK's securities settlement system) – the interbank obligations arising from the clearing of payment instructions are settled across RTGS on a 'real-time' basis. It follows therefore that these systems require RTGS to be 'open' in order for instructions to be exchanged and settled.

² See section 2.1.1 of The Bank of England's supervision of financial market infrastructures – Annual Report, March 2014. Available at <http://www.bankofengland.co.uk/publications/Documents/fmi/fmiap1403.pdf>

(CREST free-of-payment movements, however, do not generate a cash movement and thus do not require RTGS to be open.)

16. In the other sterling payment systems for which the Bank is settlement agent – FPS, Bacs, LINK, Cheque & Credit and Visa Europe – instructions are exchanged in separate infrastructures before the resultant interbank obligations are settled in RTGS on a ‘deferred-net’ basis. It follows that these retail payment systems do not require RTGS to be ‘open’ to exchange payment instructions and provide payment services to end-users. RTGS hours therefore do not constrain the hours that the retail payment systems are available for use by end-users. And so, for example, customers can make payments 24/7 via FPS or Visa, or withdraw cash via a LINK ATM. However, the retail payment systems do require RTGS to be ‘open’ to periodically settle the net interbank obligations (at defined points) that arise from customer transactions.³ Consequently, relevant to RTGS are the times that retail payment systems settle their interbank obligations for direct participants – not the hours that these systems are available to the end-user.

17. The Bank defines the operating timetable of the RTGS infrastructure. RTGS start-of-day and end-of-day provide the ‘book-ends’ for the hours during which the sterling payment and securities settlement systems can settle their interbank obligations, but do not specifically determine the hours that interbank obligations are settled by each system. Those hours are defined by each system’s operator. Consequently, a lengthening of the operating hours of RTGS is a necessary, but not sole, condition for a lengthening of the hours for interbank settlement in a payment system.

The review process

18. The Bank’s analysis was informed by input from the payment system operators, together with a cross-section of their direct participants, potential future direct participants, wholesale market participants, end-users, other financial market infrastructures (FMIs), and the UK financial authorities. The Bank also reviewed the interbank settlement hours of the UK’s principal international comparators in order to understand the drivers for different practices for other currencies.

19. The Bank conducted its review of RTGS operating hours based on the current market structure of UK payment systems. It is conceivable that this market structure could change in the medium- to long-term. Should change be implemented in future, the Bank would revisit RTGS operating hours, especially where the length of the settlement day in RTGS may be an enabler of change to payment systems.

³ And, from the introduction of cash prefunding for Bacs and FPS in 2015, RTGS is needed for direct participants to independently manage the segregated liquidity that secure interbank exposures (see Section C).

B. The review's findings: CHAPS and CREST systems

20. To determine whether market demand existed for a longer CHAPS and CREST settlement day, the Bank drew on input from the system operators, a cross-section of direct participants in these systems, other financial market infrastructures, sterling financial market associations and end-users of these systems (for example, corporate treasurers, property conveyancers, money market funds).

21. Drawing on this range of inputs, the Bank identified three sets of 'drivers' for change.

22. **First, longer CHAPS hours would enable participants active in certain financial market infrastructures (FMIs) and payment systems to meet sterling cash requirements arising later in the day.**

23. A number of FMIs and payment systems operate beyond 16:20,⁴ and the additional flexibility to make payments via CHAPS later in the afternoon would bring risk reduction advantages. For example:

- a. Cash margin calls: Cleared products can be traded beyond the current end of the CHAPS settlement day. A later CHAPS end-of-day would enable a clearing house to extend its deadline for calling intraday margin in sterling. Where that clearing house uses the Bank as its sterling concentration bank, this would potentially enable it to conduct more of its cash settlement in central bank money (in line with CPMI-IOSCO principle 9 for FMIs).
- b. Retail payment systems: FPS payments can be made by end-users on a 24/7 basis. Indirect FPS participants often use CHAPS payments to provide liquidity to 'prefund' their net position with the direct participant that processes its payments. Additional CHAPS hours would therefore enable an indirect participant to provide additional liquidity to its account after 16:20, providing greater flexibility in managing its balance sheet. Additional RTGS hours will also enable direct participants in FPS and Bacs to manage funds held in segregated accounts for prefunding more flexibly (see Section C).
- c. Continuous Linked Settlement: CLS, the foreign exchange settlement system, is in the early stages of examining the feasibility of establishing a separate Atlantic Same Day Settlement (SDS) session for currencies that can settle in the European afternoon. The Bank supports this move to help promote financial stability. The Atlantic SDS session is likely to involve currency pairings with sterling. As CLS payment obligations are settled across the relevant currencies' high-value payment systems, an SDS session involving sterling would require CHAPS to be open at the point of settlement. However, the settlement day for CHAPS currently ends before the settlement day in the majority of other major currency high-value payment systems; consequently, CHAPS settlement hours could act as a constraint on the timing of an Atlantic SDS session including sterling. A longer CHAPS settlement day would relieve that potential constraint, perhaps enabling a more optimally timed Atlantic SDS session.

⁴ The deadline for settling customer transactions in CHAPS is 16:05, followed by a 15-minute window for final interbank transactions. CHAPS closes for interbank settlement at 16:20. End-users' deadlines for submitting CHAPS instructions to their bank can be significantly earlier than 16:05.

24. **Second, a longer CHAPS and CREST settlement day would enable financial market participants to undertake some funding and investment decisions later in the day.**

25. This would better align the wholesale settlement day with the needs of some participants and end-users of financial markets by providing them with more flexibility to manage their balance sheets, and may also enable some participants to reduce balance sheet risks. For example:

- a. A longer CHAPS and CREST settlement day would give UK end-users additional flexibility to meet funding needs by borrowing same day. For example, more time would be available for corporates to make decisions on accessing funding in sterling markets. There would also be an increased overlap between the sterling high-value payment system and financial markets operating in other currencies. This would, for example, give UK corporates additional time to fund from the US markets and swap the proceeds into sterling, enabling them to manage their funding requirements more flexibly. Currently CHAPS end-of-day occurs at around 11:00 US Eastern Standard Time.
- b. The business models of some end-users dictate that they make daily balance sheet investment decisions in the early afternoon, which can be after the deadline set by their settlement bank or custodian for securities to be settled by CREST 'Delivery by Value' (DBV).⁵ Consequently, settlement deadlines prevent these end-users from being able to lend any surplus liquidity on their balance sheet to sterling secured markets in the afternoon. A longer CREST settlement day may enable certain end-users to make greater use of the secured market, as opposed to the unsecured market, therefore enhancing their options for risk management of their balance sheet.

26. **Third, a longer CHAPS settlement day would enable end-users to make high-value transactions later in the business day.**

27. Many end-users, especially in the corporate sector, use CHAPS to settle high-value transactions quickly and with certainty. Settlement banks set deadlines for their customers for instructing payments based on the latest time they can settle in CHAPS before the system deadline. If the system end-of-day occurred later in the afternoon, settlement banks would be able to set a later deadline for their customers: this could better align the payment instruction deadlines set for end-users with their preferred business hours.

28. For example, a longer CHAPS settlement day would enable settlement banks to set a later deadline for property conveyancers to initiate the settlement of a property transaction, and would enable corporates to instruct and receive CHAPS payments for a greater proportion of their chosen business day. It would also give end-users that operate in time-zones to the west of the UK (most notably those that are based on the East Coast of the USA) more flexibility during their business day to access the CHAPS and CREST systems.

29. **These inputs to the Bank's review articulated a strong case for CHAPS and CREST to operate later in the afternoon.**

⁵ The current deadline for settlement banks to input DBV instructions is 16:02. End-users' deadlines for DBV instructions can be significantly earlier.

30. The Bank's assessment is that the marginal benefits to end-users of having the ability to settle in the CHAPS and CREST systems decrease after around 18:00, as the typical business day draws to a close for economic agents that characteristically generate transactions for CHAPS and CREST settlement (financial institutions, UK-based corporates, property market conveyancers). Input to the Bank's review articulated little demand for these systems to operate significantly later than around 18:00.

31. Moreover, the Bank's assessment is that the marginal costs of a later end-of-day increase rapidly during the evening as there are likely to be substantial market-wide technical system and staffing implications from a considerably longer settlement day. Additionally, the profile of operational risks associated with operating CHAPS and CREST settlement significantly beyond around 18:00 increases, as operational problems could occur outside the normal business day when core staff are less likely to be readily available.

32. Operating RTGS until around 18:00 would deliver greater alignment of the UK high-value payment and securities settlement day with the typical business hours of end-users, an alignment that already exists in other major economies.

33. The Bank's discussions with other central banks demonstrated that the local time start-of-day for some other countries' wholesale settlement systems can be significantly earlier than in the UK. However, these overnight settlement hours have been designed to fulfil specific drivers that are not relevant to the UK, most notably for the settlement of CLS obligations.⁶ The current start-of-day for CHAPS and CREST was not considered a constraint by participants providing input into the Bank's review: there is sufficient time between 05:45 and 16:20 to settle the small volume of same-day payments that are initiated before 05:45.

34. The Bank's review also considered whether there would be demand for weekend wholesale settlement. Based on the inputs, the Bank's assessment is that there is no material demand for weekend CHAPS and CREST system settlement.⁷

35. Drawing on input to the review, the Bank's assessment is that there is a strong case for CHAPS and CREST to operate around two hours later each business day, but no demand currently for these systems to operate overnight or at weekends. Section D outlines the Bank's proposal to change RTGS operating hours accordingly, and describes the next steps.

⁶ The internationally-harmonised payment window for market participants to meet pay-in requirements arising in the main daily CLS settlement session (for next-day CLS transactions) occurs between 07:00 and 11:00 UK time. In the United States and Canada, for example, this is between 02:00 and 06:00 local time and hence their high-value payment systems must open by that time in order to settle CLS payments. In contrast, New Zealand and Australia, for example, need to operate their high-value payment systems later into their evenings for the same reason. When CLS was established in 2002, CHAPS hours were able to facilitate the CLS pay-in window without requiring any change – this is one key reason why the UK and the Eurozone have not been prompted to operate their high-value payment systems beyond the daylight hours, unlike in some other countries.

⁷ The Bank notes that wholesale transactions are not settled at the weekend in other major economies.

C. The review's findings: the sterling retail payment systems

36. The Bank's review considered whether a longer RTGS operating day would enable beneficial change in the sterling retail payment systems that settle interbank obligations in central bank money.

37. The retail payment systems require RTGS to be 'open' to periodically settle – at defined points in time – the net interbank obligations that arise from customer transactions. Following the implementation of 'prefunding' for Bacs and FPS in 2015, direct participants in these two payment systems will also require RTGS to be open to independently move funds between their reserves accounts in RTGS and their segregated accounts for prefunding their Bacs and FPS net positions.

38. RTGS is not, however, required to be 'open' for direct participants to exchange individual payment instructions and therefore for the payment system to be available to the end-user. Retail payment system users can already send and receive funds on a 24/7 basis, for example, via FPS or Visa Europe, or by withdrawing cash via a LINK ATM.

39. Accordingly, as part of the review, the Bank discussed the timing of retail payment system interbank settlement with each of the retail payment system operators that settle in central bank money (Bacs, Visa Europe, FPS, LINK, Cheque & Credit), and a cross-section of direct participants and indirect participants. It also discussed the management of liquidity for Bacs and FPS prefunding with system participants, as well as the system operators.

Consideration of additional interbank settlements

40. The Bank considered two possible benefits to altering the timing and / or frequency of interbank settlement for retail payment systems.

41. First, it could reduce **settlement risk**. Interbank settlement in central bank money extinguishes obligations between direct participants in a payment system. In the absence of any mechanisms that mitigate settlement risk (such as backing unsettled interbank obligations with collateral), more frequent or more optimally positioned points of net interbank settlement throughout the day could reduce the duration or size of unsettled obligations and hence settlement risk. However, additional or better-timed interbank settlements can only reduce, rather than entirely mitigate, settlement risk. As there are mechanisms to entirely mitigate settlement risk in sterling retail payment systems, such as collateralisation, the Bank's assessment is that such a reduction of settlement risk is not a driver for longer RTGS operating hours.

42. Second, it could **reduce the liquidity required** to cover exposures in retail payment systems. Interbank obligations are incurred before interbank settlement occurs across RTGS accounts. For a retail payment system to continue to operate in the event of a participant default, either the defaulting participant, the surviving participants, or the system operator must be able to meet the interbank obligations of the defaulter. This has a cost, in terms of the liquidity that must be set aside to cover exposures. Changing the points of interbank settlement for a retail payment system has the potential to reduce the size of such liquidity

requirements. This would reduce the likelihood that, under stressed conditions, banks were unable to settle payments due to liquidity shortfalls, enhancing UK financial stability.

43. The Bank therefore considered whether there were opportunities to meaningfully reduce system liquidity requirements by redesigning the frequency of net settlement, as this could be a reasonable driver for changing RTGS operating hours.

44. The Bank analysed the case for more frequent interbank settlement for FPS, which currently settles three times each business day. Liquidity requirements in other retail payment systems are either not sufficiently material, or could not be changed by varying the time of day of interbank settlement, i.e. for systems that settle over a multi-day cycle.

45. Drawing on input from the FPS system operator, the Bank performed a quantitative analysis of FPS payments to assess whether there is a case for introducing additional points of FPS interbank settlement to reduce the liquidity required for settlement, either during the night or at the weekend (i.e. outside current RTGS operating hours). This analysis used a range of forward-looking assumptions to consider plausible future changes in FPS interbank flows. The Bank's assessment, discussed with the FPS system operator, is that the potential liquidity savings, and therefore reduction in liquidity risk, would not be material, including at times of peak demand. Such liquidity savings would not be sufficient to justify the costs associated with introducing and facilitating additional points of interbank settlement.

46. A potential secondary change from extending RTGS hours by around two hours for CHAPS and CREST would be the ability to move the final daily FPS interbank settlement to slightly later in the afternoon. It is currently at 15:45, but could occur between 17:00-18:00 when RTGS hours are extended. This might generate some small liquidity saving benefits for direct participants, but these are unlikely to be material. **The Bank has agreed with the FPS system operator that it will consider with its participants, by end-2015, the case for moving the last interbank settlement later in the revised RTGS operating day.**

Consideration of enabling additional access to reserves for prefunding

47. The Bank also considered whether direct participants in Bacs and FPS will need significantly longer RTGS hours in order to access their reserves outside the business day, in the context of the forthcoming implementation of a cash prefunding settlement model for the Bacs and FPS systems.

48. With the advent of prefunding, direct participants' net sender caps in the FPS and Bacs systems (and any increases in those caps) will have to be matched by funds held in segregated accounts for prefunding (within RTGS). This will fully eliminate settlement risk in these two payment systems.

49. Participant banks will be encouraged to segregate 'surplus' reserves balances before the end of the normal RTGS day in anticipation of possible out-of-hours cap increase needs. In the rare event of a participant needing an emergency cap increase out-of-hours for which there are not sufficient *ex ante* segregated reserves balances, that participant will be able to contact the Bank at any time with a view to securing such additional segregation.

50. It is important that direct participants can, for contingency purposes, access their reserves outside the business day in order to be able to prefund unforeseen retail outflows at times of financial stress. However, the Bank's assessment is that responding to this requirement with a major extension of RTGS operating hours would be disproportionate. Instead, a combination of prudent behavioural principles and specific, contingency operational arrangements will be able to deliver effective 24/7 access to reserves for prefunding purposes without further extending RTGS operating hours.

Assessment of drivers from retail payment systems

51. **Drawing on inputs to the review, the Bank's assessment is that, under the current configuration of the sterling retail payment systems, there are no strong drivers for a further change to RTGS operating hours, either from the perspective of settling retail systems' net interbank obligations beyond current RTGS hours, or to give banks access to their sterling central bank reserves for a greater part of the day.**

52. However, it is possible that drivers may exist in the future. Any significant change in market structure could lead the Bank to reconsider RTGS operating hours, especially where these may be an enabler of change.

D. Conclusions, implications and next steps

53. **The Bank has decided that it will operate RTGS for around two hours later each business day. This change will enable a longer CHAPS and CREST settlement day.**⁸

54. The Bank's assessment is that this lengthening of the settlement day would be sufficient to capture the vast majority of benefits identified in Section B of this review.

55. However, for the identified benefits to the end-users of the CHAPS and CREST systems to be realised, the deadlines set by settlement banks to their customers for instructing transactions will need to be moved later in the day, in line with a new, later definition of the end of the CHAPS and CREST settlement day. While the timing of these customer deadlines is a contractual matter for discussion between the parties concerned, **the Bank expects settlement banks to deliver these benefits through to end-users by setting later instruction deadlines that match the extension to RTGS hours.**

Implications

56. The Bank has reviewed its technical provision of the RTGS service to direct participants and concluded that it will be able to provide it for an additional two hours each day without implementing any technical changes to the RTGS infrastructure. However, there will be a small increase in the costs of operating RTGS (estimated to be around 2%) that the Bank would recover from direct participants via the Bank's charges for transactions in RTGS.

57. Access to the Bank's Sterling Monetary Framework (SMF) is an important tool for CHAPS and CREST settlement banks to be able to manage their liquidity in the event of unexpected disruptions. The Bank will extend the availability of certain SMF facilities to reflect the longer RTGS operating hours. Reserves accounts will be available for the movement of funds throughout the longer RTGS operating day, and Operational Standing Facilities will continue to be available for transfers to / from reserves accounts for a short period after the new, later end-of-day. The Bank will review the timing of the deadline for applications to use the Discount Window Facility.

58. As part of the input to the Bank's review, wholesale market participants anticipated that the sterling money market trading day will adapt its hours accordingly, and continue to trade up to the new, later CHAPS and CREST settlement deadlines. There will, however, likely be a period of transition while the market adapts to the longer day. The Bank will discuss this with market participants to plan for a smooth transition.

⁸ There is a strong case for CHAPS and CREST to continue to broadly co-time their definitions of the end of the settlement day. The two systems are, respectively, used to settle unsecured and secured money market transactions, so there is a natural co-timing of the two settlement days.

Next steps

59. **The Bank requests that the operators of the CHAPS and CREST systems, CHAPS Co and Euroclear UK & Ireland (EUI), engage with the users of their systems to design revised system deadlines for their settlement day that end around two hours later than currently.**⁹

60. As part of that engagement, the Bank requests that:

- a. CHAPS Co and EUI consider the maximum possible length of contingency extensions to the settlement day, which are occasionally necessitated by technical system problems or market conditions. The Bank recognises that settlement banks have operational constraints which prevent them from processing these transactions very late in the evening (even in contingency).
- b. CHAPS Co and EUI propose a joint implementation date for the change in the operating hours of CHAPS and CREST. The Bank suggests that participants conduct their analysis based on an implementation date in **autumn 2015** as a planning assumption. If participants identify from their impact assessments that there are key enablers of this change that they cannot reasonably be expected to deliver by autumn 2015, the Bank will assess this information in conjunction with CHAPS Co and EUI before announcing the implementation date.
- c. EUI consider, as a secondary action, the possibility of accompanying changes to its timetable for free-of-payment securities movements. Market participants have reported that additional time to make a CREST free-of-payment securities movement (i.e. without an associated cash payment) would increase their flexibility for mobilising collateral.^{10 11}

61. **The Bank would like CHAPS Co and EUI to jointly recommend a solution to the Bank by end-January 2015.**

62. During February 2015, the Bank will agree the detail of the proposed new settlement day with CHAPS Co and EUI, and a joint implementation date. The Bank expects that it will announce these changes to participants, with CHAPS Co and EUI, in March 2015.

⁹ There will also be a number of accompanying changes to system governance for system operators to consider: for example, a longer CHAPS settlement day will require CHAPS Co to revisit the design of its CHAPS 'throughput' rules.

¹⁰ For example, it would potentially enable participants trading in cleared products to meet initial margin collateral requirements using sterling-denominated securities later in the day.

¹¹ However, CREST free-of-payment movements are not settled by the RTGS system, and were therefore not within the scope of the Bank's review.