

Continuous Linked Settlement (CLS) and foreign exchange settlement risk

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CLS – the international foreign exchange settlement system – was successfully launched in September 2002. Two years on, the volumes and values of transactions settled in CLS continue to grow. However, well over half of global foreign exchange settlement still appears to take place outside CLS, especially for transactions involving non-bank financial institutions such as investment funds and hedge funds. The G10 central banks and banking supervisors have made clear their interest in how banks manage settlement risk in such transactions. They continue to monitor whether enough has been done to reduce this risk, and to consider what further action might be necessary.

G10 CENTRAL BANKS set out a strategy to reduce foreign exchange settlement risk in the 1996 Allsopp Report.¹ One strand of this strategy was a call for action by private sector industry groups to provide risk-reducing multi-currency settlement services. The successful launch of CLS in September 2002 has been the banking sector's main response to that requirement.² This article explores how far CLS's market coverage has expanded, and examines which sectors of the market have not so far taken up the risk-reduction benefits offered by CLS. For sectors and institutions not participating in CLS, central banks and supervisors continue to be interested in the magnitude of settlement exposures and how the consequent risks are being managed. For those participating in CLS, different risk management issues arise. The article considers how the liquidity needs of CLS settlement membership are managed through the Inside/Outside swap mechanism – at the cost of reintroducing a limited amount of settlement risk – and reviews how CLS controls the operational risk inherent in a single system linking multiple financial markets.

CLS market coverage

Chart 1 shows that volumes and values of transactions settled in CLS grew strongly in the first year of its operation and have continued to increase

over the past year. In 2004 Q3, total sides settled averaged US\$1.4 trillion – representing turnover of US\$0.7 trillion given that each transaction has two sides. It is not possible to measure precisely CLS's share of the global market for foreign exchange settlement because up-to-date figures for the market as a whole are not available. However, the results of the latest BIS Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity indicated that total daily turnover in the foreign exchange market averaged some US\$1.9 trillion in April 2004.³ Although the two sets of figures are not directly comparable, the survey results suggest, when taken together with the CLS settlement data, that a substantial share of global foreign exchange transactions is still being settled outside CLS. Which types of transactions are not settled through CLS and which counterparties remain exposed to foreign exchange settlement risk are questions of interest to central banks and supervisory authorities.

Gaps in CLS market penetration

Since there are costs as well as benefits for institutions from participating in CLS,⁴ transferring settlement of foreign exchange business into CLS will not be appropriate for every company trading foreign exchange, particularly for those with a low volume of

(1) Bank for International Settlements, 'Settlement Risk in Foreign Exchange Transactions', March 1996. The Report was produced by a Steering Group chaired by Peter Allsopp of the Bank of England.

(2) CLS removes the risk of loss of principal in a foreign exchange transaction by ensuring simultaneous, or payment-versus-payment, settlement of both sides of the transaction. This process and other features of the CLS system are described in more detail in Box 1.

(3) Fifty-two central banks and monetary authorities participated in this survey. They collected data on turnover in traditional foreign exchange markets – spot, outright forwards and foreign exchange swaps – and in over-the-counter (OTC) currency and interest rate derivatives.

(4) Settlement members of CLS must purchase a shareholding in CLS Group Holdings, as well as meet the system set-up and operational costs of settling transactions in CLS. A per-item fee is charged for each transaction settled. Costs for third-party users are subject to agreement with their settlement member.

business or making transactions of small aggregate value. However, the BIS Triennial Survey data, together with discussions with current settlement members of CLS,¹ suggest that there are institutions with significant volumes and values of business which continue currently to settle outside CLS.

Participation by such institutions in CLS, either as members or as third-party users, could reduce risk to these institutions, their counterparties and the system as a whole.

Chart 1
Daily volumes and values settled in CLS
(ten-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.

Despite the absence of comprehensive statistics on CLS's share of the individual sectors of the market for foreign exchange settlement, CLS's own studies indicate three main gaps in its market penetration. CLS has managed to capture a significant portion of the foreign exchange transactions between the world's largest banks. There has, however, been less success, so far, in extending its services to other banks, to non-bank financial institutions and to non-financial companies.

Banks

The list of members and third-party users in CLS at end-October 2004 gives some insight into use of CLS in the inter-bank foreign exchange market.² All of the 55 members are commercial or investment banks, while close to 80% of around 180 third-party users are also banks. In the G10 countries, most major banks active in the foreign exchange market are settlement members

or third-party users of CLS.³ The BIS Triennial Survey found that 53% of trades were between reporting banks, representing a turnover of around US\$900 billion. Taken with the value of transactions settled in CLS, this suggests that the larger part by value of total inter-bank trades are settled in CLS.

As the home authority, the Bank of England has a particular interest in the sterling business settled in CLS. The average daily value of sterling transactions settled in CLS in April 2004 was equivalent to some US\$147 billion. This compared with an average sterling turnover estimated by the BIS at some US\$320 billion equivalent. A raw comparison of figures for the sterling market suggests that a marginally higher share of sterling business is settled in CLS than the share for all currencies combined. Nevertheless, that still leaves well over half of all sterling business settled outside CLS.

Four of the major UK-owned clearing banks (Barclays, HSBC, RBS and Standard Chartered) joined CLS as shareholders and became settlement members from the outset. A few UK-owned banks which are significant, but not among the largest, traders in foreign exchange, are absent from the current list of CLS settlement members and third-party users. The most significant of these are in the process of becoming third-party users. Nevertheless, participation in CLS by UK institutions still contrasts with some other countries – for instance Switzerland, where many banks, including some with only a small presence in the foreign exchange market have chosen to participate in CLS, usually as third-party users.

Non-bank financial institutions and non-financial corporations

The most obvious gaps in CLS's current coverage are in the area of non-bank financial institutions and non-financial corporations. This is perhaps not surprising given that regulatory pressure for the reduction of foreign exchange settlement risk was directed in the first instance at banks.

There are less than 30 non-bank financial institutions already participating in CLS. The BIS 2004 Triennial

(1) Settlement members are those that hold an account at CLS Bank.

(2) These data are provided and updated regularly by CLS on its website: www.cls-services.com

(3) Most large Canadian banks are not yet participating in CLS, but have indicated that they intend to begin submitting trades for settlement in 2005. One possible reason why Canadian banks have not so far used CLS is that it does not yet have the capacity to settle same-day value trades in Canadian/US dollars. CLS is investigating the feasibility of introducing additional (later) settlement sessions in which some same-day trades could be settled, including those involving the Canadian dollar.

survey found, however, that foreign exchange trading between reporting banks and their (non-reporting) financial customers had risen markedly since the 2001 Survey, accounting for one third of total turnover in April 2004. The survey suggested that this may to a large extent reflect a significant increase in activity by hedge funds and commodity trading advisers, as well as the robust growth of trading by investment/fund managers. Very few such institutions currently participate in CLS.

CLS has worked with user groups to enable investment/fund managers to settle foreign exchange deals in CLS via custodian banks that are CLS settlement members or have arrangements with a settlement member.¹ In due course, this may help encourage greater participation by such institutions. For funds with a higher risk appetite, for example some hedge funds, the additional costs of using CLS may however exceed the value that they attach to eliminating settlement risk incurred when trading with large banks, making them unlikely future third-party users.

The presence of a few major non-financial companies in the list of third-party CLS users indicates that there is a business case for participation in the system by some non-financial firms. Besides risk-reduction and the potential savings from netting of liquidity requirements, third-party participation can offer scope for savings in processing costs.

The number of non-bank institutions participating in CLS as third-party users seems likely to grow over time, although the extent and speed of that growth are not yet clear. One way for banks to encourage counterparties who remain outside CLS to join would be to use differential pricing, or lower trading limits, for non-CLS participants to reflect the extra risk of dealing with these counterparties. But for counterparties which remain outside CLS, banks need to employ other ways of managing and containing foreign exchange settlement risk.

Managing foreign exchange settlement risk outside CLS

Banks, and their supervisors, have an interest in ensuring that they measure, monitor and control

foreign exchange settlement risk. The Basel Committee on Banking Supervision published supervisory guidance on principles and methods for reducing foreign exchange settlement risk in September 2000.² The guidance expects banks to measure foreign exchange settlement exposures accurately and set settlement limits for all counterparties. Collateral arrangements and legally sound netting arrangements are identified as other possible ways of reducing risk. The guidance envisages action by supervisors where they determine that a bank's settlement risk management is not adequate or effective. It notes that if settlement exposures remain at levels considered by supervisors higher than necessary, tools such as large exposure limits or additional capital requirements could be used.

Extending CLS to new currencies

Adding new currencies to the CLS settlement process could provide another way of extending CLS's risk reduction benefits. Currently, CLS can settle foreign exchange transactions that involve any two of eleven currencies. Four more currencies are scheduled to start settling by early 2005 (these are listed in Box 1). Figures from the BIS's 2004 Triennial Survey suggest that trade in the currencies outside these 15 currently accounts for only around 5% of total turnover in the global foreign exchange market. Given that there are fixed costs to CLS and its settlement members of introducing new currencies, this may weaken the business case for adding further currencies to CLS. At the same time, simple comparisons of values and volumes for these currencies with those for currencies already settled in CLS do not give an accurate measure of the relative risk-reduction that could be achieved. Besides the size of the currency exposure, the probability of non-receipt also needs to be taken into account. Members and prospective users of CLS, as well as central banks and other regulators, may consider that risk-reduction benefits warrant the inclusion in CLS of other currencies.

For a currency to be included in CLS, it must meet certain risk-related eligibility criteria. These include:

- a sufficient number of liquidity providers (their role is described in Box 1) in that currency;

(1) The work included agreement on an industry standard coding for SWIFT messages to help identify the fund counterparty in a foreign exchange transaction.

(2) Basel Committee on Banking Supervision, 'Supervisory Guidance for Managing Settlement Risk in Foreign Exchange Transactions', September 2000.

Box 1: Main features of the CLS System

CLS is a complex system and it is not possible in this short article to give a full account of its rules. The following is therefore a summary of its main features.

Legal Structure, participation and oversight

The Continuous Linked Settlement (CLS) system is designed to eliminate principal risk on the foreign exchange transactions that it settles. The service is provided by CLS Bank International (CLS Bank), a US-incorporated special-purpose bank with a sister operations company (CLS Services Ltd) in the United Kingdom. Its parent company (CLS Group Holdings AG, incorporated in Switzerland) is currently owned by 69 of the world's largest financial organisations (mainly commercial banks). CLS Bank operates as a settlement agent for foreign exchange transactions; it does not become a counterparty to its users' transactions.

Participation in the CLS system can take two main forms, as a member or as a third-party user.¹ A settlement member's foreign exchange transactions are settled directly across its accounts at CLS Bank, while those of a third-party user (which has no direct relationship with CLS Bank) are settled by a settlement member on its behalf.

CLS is overseen on a co-operative basis by the central banks which issue the currencies settled in the system, under the leadership of the Federal Reserve.² The framework for this oversight is that of the Principles for Co-operative Central Bank Oversight of Cross-border and Multicurrency Netting and Settlement Schemes set out in the 'Lamfalussy Report' published by the BIS.³

The settlement and funding process

CLS currently settles transactions involving eleven 'eligible' currencies. These are the Australian dollar, Canadian dollar, Danish krone, euro, Japanese yen, Norwegian krone, Singapore dollar, sterling, Swedish krona, Swiss franc and US dollar. Four more

currencies – the Hong Kong dollar, the Korean won, the New Zealand dollar and the South African rand – are due to be admitted by early 2005.

CLS Bank uses the large-value payment systems of the currencies that it settles to make and receive payments to and from members, so CLS's daily settlement process takes place over a short (five hour) period during which these systems are concurrently open (although not all are open for the full five hours). In Central European Time (CET), this is 07.00 to 12.00 (one hour earlier in UK time).

Each settlement member holds a multi-currency account at CLS Bank, with balances in each currency (these balances are normally zero at the start and end of the settlement day). Settlement of a foreign exchange transaction is effected on a gross basis by simultaneous credits and debits across the accounts of the two parties to the transaction in the relevant currencies, subject to the risk management controls outlined below being met. This ensures that principal risk is eliminated for each transaction. However, there is a clear distinction between settlement and the funding process. To ensure an efficient use of liquidity, members have to fund only their net short currency positions for the day, and CLS Bank pays out to members the amounts corresponding to their net long currency positions. Furthermore, the system minimises the liquidity impact on members and local payment systems of the funding requirements by allowing each settlement member to spread its funding over several instalments ('pay-ins'), subject to a minimum schedule issued at the start of each day to each member for each currency. Net long currency positions are also paid out to members in instalments ('pay-outs') as long balances in the appropriate currencies become available. There is no schedule set at the beginning of the day for a member's pay-outs since it is not possible to forecast the exact time at which members will make their pay-ins.

(1) There are two forms of membership: settlement membership and user membership. The transactions of a user member, like those of a third-party user, are settled across a settlement member's account. Unlike those of a third-party user, they are submitted directly to CLS Bank. Currently, there is one user member of CLS.

(2) The Federal Reserve Bank of New York is also the supervisor of CLS Bank.

(3) Bank for International Settlements, 'Report of the Committee on Interbank Netting Schemes of the Central Banks of the Group of Ten Countries', November 1999.

Risk controls

Transactions submitted by members are queued at the beginning of the day. The settlement of each transaction proceeds in turn from 07.00 CET as long as certain risk controls are satisfied once the transaction is settled. These are:

1. Members can run debit balances in individual currencies but these cannot exceed given limits. These are called Short Position Limits, or SPLs – although a better name might be short balance limits. The SPL for a given currency is the same for all members, and is a function of the liquidity available in that currency from liquidity providers to CLS Bank (the role of liquidity providers is explained below).
2. The aggregate of each member's short balances across all currencies cannot exceed a specified limit – the Aggregate Short Position Limit, or ASPL – for that member. This is calculated as a function of, amongst other criteria, the member's credit rating.
3. Each member must retain net positive value overall on its account across all currencies at all times during the settlement process. This ensures that short balances in currencies are collateralised by long balances during the settlement process, and that CLS Bank (and by implication other members) is not extending credit to the member on its account. Haircuts are applied to a member's currency balances to help protect the account's overall positive value against exchange rate variations.

Failure management: liquidity providers

CLS has a range of additional measures to limit the impact of a payment default by a member on other members. Liquidity providers are banks that commit to provide liquidity in a given currency to CLS Bank to enable it to make timely pay-outs to members in these currencies in certain scenarios in which other members fail to meet their pay-in requirements. Such a scenario could occur, for example, if a member fails to meet one of its scheduled pay-ins for a currency after all transactions have settled across members'

accounts at CLS Bank,¹ leaving the member with a short balance in that currency on its account. CLS Bank could then be left with a liquidity shortfall in that currency, preventing it from completing the pay-outs to other members. The liquidity provision mechanism involves CLS Bank selling some of the positive balances that the non-paying member retained on its account in other currencies to a liquidity provider in exchange for the required amount of the currency expected from the non-payer. The transaction initially takes the form of an overnight foreign exchange swap, so it is reversed the following day, on the assumption that the problem experienced by the non-paying member is temporary and the non-payer will by then have funded its currency shortfall. If, however, the member's problem proves to be more serious and it continues to fail to pay in the missing amount, CLS Bank will eventually convert the foreign exchange swap with the liquidity provider into an outright purchase of the currency.

The commitments available from liquidity providers in a given currency are sufficient to ensure that, even in the event of the failure of the liquidity provider with the largest commitment to meet its obligation, the other liquidity providers' commitments will be enough to cover the short balance of the non-paying member.

Loss sharing arrangements

Despite the extensive facilities from liquidity providers (which have, at the time of writing, not been used by CLS since the start of its operations), exceptional circumstances could still lead CLS Bank to record a loss. This would be the case if, for example, exchange rate variations were sufficient to exceed the volatility haircuts on the balances on the failing member's account and cause its overall value to become negative. CLS Bank would then have insufficient positive balances to fund the swap transactions with liquidity providers. In this case, CLS would allocate these losses to the surviving members according to a loss allocation scheme. There are several stages to this, including an initial pro rata allocation of losses to members who had dealt with the failing member and then a further allocation to all surviving members if the first allocation raised insufficient funds.

(1) Settlement is normally completed, with finality, by 09.00 CET.

- satisfaction that the currency's relevant large-value payment system meets CLS Bank's operational requirements, including that it provides Real Time Gross Settlement (RTGS) or equivalent;
- adequate access to liquidity in that currency;
- acceptability to CLS Bank of any restrictions or conditions on the transferability of the currency;
- acceptability to CLS Bank of any restrictions on convertibility;
- an assessment satisfying CLS Bank that volatility in the currency can be managed with practicable haircuts;
- receipt of a satisfactory legal opinion on the finality of settlement instructions between members and the finality of payments made to and received by CLS Bank in the subject currency.

These criteria are designed to ensure that the inclusion of currencies achieves the intended settlement risk reduction benefits without introducing risks of disruption to CLS users, or to other currency areas and their payment systems connected to each other via CLS.

To accommodate a wider range of currencies without unacceptable additional risk of disruption to the settlement process, CLS has worked with its members, liquidity providers and central banks over the past two years to develop a revised Framework for Eligible Currencies. The framework complements the currency eligibility criteria by providing a clear articulation of the CLS system's risk design components for existing and new currencies. It includes provisions to mitigate the potential credit and currency risks faced by liquidity providers.¹ These include, for example, the possibility of assigning a Short Position Limit (Box 1) of zero to a 'deteriorating' currency (one for which the relevant sovereign credit rating has fallen below the equivalent of BBB), so that an instruction involving that currency can settle only on a cash basis.

Like the eligibility criteria, the revised framework seeks to ensure that any new currencies do not increase the operational, liquidity, legal, market or

credit risks to CLS settlement members, liquidity providers and other stakeholders beyond acceptable levels. The framework thus makes it possible for a wide range of currencies to be considered for inclusion in the CLS system.

The new risk-management challenges of continuous linked settlement

Principal risk has been eliminated in the foreign exchange transactions settled through CLS. But successful settlement requires management of some other risks by settlement members and by CLS itself. Meeting potentially large timed pay-in requirements depends on reliable liquidity management. The settlement process also involves new operational interdependencies – with operational failures potentially having a wide cross-border impact. The success of CLS therefore also depends on robust operational risk management.

Liquidity management and the Inside/Outside swap mechanism

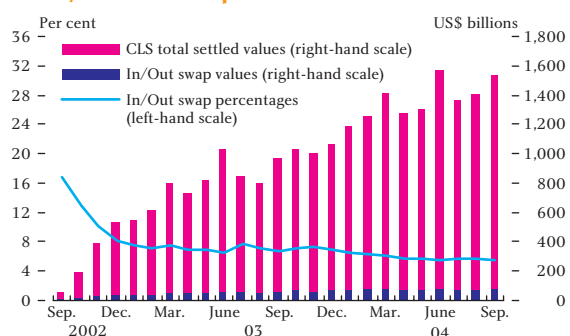
CLS reduces the size of members' liquidity needs by requiring them to pay to CLS Bank amounts corresponding to only their net short currency positions. However, as Box 1 explains, CLS also requires members to make their pay-ins according to a minimum schedule. Members therefore still need to ensure that they have sufficient liquidity in place to meet this minimum schedule. Inside/Outside (I/O) swaps are a mechanism that allows settlement members to trade down their short net currency positions in CLS Bank through bilateral trades in an effort to ease the time-specific liquidity pressures generated by their CLS pay-in requirements. The swap consists of an 'in' leg settled in CLS, in which the two members buy some or all of their respective short currencies and sell some or all of their respective long currencies, and an 'out' leg for the same amounts and currencies in the opposite direction settled outside CLS where time pressures for settlement and liquidity are less intense.

A certain amount of principal risk is reintroduced by the I/O swap mechanism since one leg of each swap must be settled outside CLS. Members expected the mechanism to form an essential tool for alleviating the liquidity pressures caused by possible large imbalances between their 'inside' and 'outside' CLS positions. It was thought, however, that as the

(1) Box 1 describes the CLS settlement process and the role of liquidity providers.

number of users of the system grew these imbalances would diminish and members' 'in' positions would gradually resemble their overall foreign exchange market positions, reducing the need for the I/O swap mechanism. Chart 2 shows that the value of I/O swaps as a percentage of the total values settled in CLS did indeed fall sharply in the first few months of CLS's operations, reflecting increases in the system's netting efficiency as settled values grew. However, the share has since stabilised at around 6% and the average absolute value of I/O swaps has in fact increased slightly.

Chart 2
Inside/Outside swaps^(a)



Source: CLS Bank International.

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

Given that CLS aimed to eliminate principal risk, central banks have needed to consider whether it is appropriate that CLS incorporates a mechanism that re-introduces a proportion of principal risk into foreign exchange market positions. The Bank's meetings with UK members of CLS indicate that they see the reintroduction of a small proportion of foreign exchange principal risk as an acceptable cost of reducing the liquidity risk that could otherwise result from having to make large pay-ins by tight deadlines. Like many payment and clearing systems designed to reduce credit risk, CLS can make new demands on liquidity management. There is a trade-off between reducing credit risk and minimising liquidity risk. For the time being, the extent of the trade-off in CLS seems in the Bank's view to be acceptable. However, the role and impact of the I/O swaps mechanism will be kept under review as the values settled by the system increase.¹

Operational risk

Operational risk is widely recognised as an important and growing risk within the financial system, and one that can be particularly concentrated in payment and settlement systems. Given the potential cross-border impact via CLS of an operational failure, appropriate management of operational risk in CLS is given a high priority by regulatory authorities and CLS itself. The central banks that co-operatively oversee CLS (Box 1) have therefore worked closely with CLS and its settlement members to ensure that the system maintains a high level of resilience.

CLS's infrastructure is designed to provide for a high availability of service. CLS has processes to mitigate the risk from key dependencies on both its own systems as well as on various external parties, including SWIFT, the RTGS systems through which it receives and makes its currency payments, settlement members and their nostro agents, and its liquidity providers. The unavailability of CLS's own operations centre or primary processing system can be recovered from quickly. CLS has also agreed a set of contingency arrangements with each RTGS system provider to cope with an RTGS outage or with the loss of links to an RTGS system, and settlement members have to satisfy high operational requirements set by CLS. Contingency arrangements are regularly reviewed and tested with all members.

Conclusion

CLS is still evolving, recruiting new users and introducing new currencies. This increased use of CLS will contribute further to the reduction of foreign exchange settlement risk. But large parts of the foreign exchange market are not yet settling through CLS and it is not clear that CLS will reach all these parts. The central banks that oversee CLS continue to monitor the success of the overall G10 strategy and to assess what further action might be necessary to ensure its success. One option may be to review whether there is a need for greater use of the supervisory tools identified in the Basel Committee guidance.

(1) CLS itself is endeavouring to find ways to reduce the extent to which settlement risk is reintroduced by I/O swaps. This includes investigating the feasibility of introducing additional (later) CLS settlement sessions, in which some of the current out legs of I/O swaps could be settled, thus eliminating the principal risk currently reintroduced by these legs.