

# **Supervisory Guidance for Managing Settlement Risk in Foreign Exchange Transactions**

## **I Introduction**

1. Foreign exchange (FX) settlement risk is the risk of loss when a bank in a foreign exchange transaction pays the currency it sold but does not receive the currency it bought. FX settlement failures can arise from counterparty default, operational problems, market liquidity constraints and other factors. Settlement risk exists for any traded product but the size of the foreign exchange market makes FX transactions the greatest source of settlement risk for many market participants, involving daily exposures of tens of billions of dollars for the largest banks. Most significantly, for banks of any size, the amount at risk to even a single counterparty could in some cases exceed their capital.

2. FX settlement risk is a form of counterparty risk involving both credit risk and liquidity risk. As with other forms of risk, banks need to ensure that they have a clear understanding of how FX settlement risk arises. On the basis of this understanding, policies for managing the risk should be developed at the highest levels within the bank and implemented through a formal and independent process with adequate senior management oversight. As part of this process, a bank has to have measurement systems that provide appropriate and realistic estimates of FX settlement exposures on a timely basis. The development of counterparty settlement limits and the monitoring of the exposures against these limits is a critical control function. The bank also needs to have procedures for reacting in a prompt and balanced manner to failed transactions or other settlement problems.

3. The purpose of this guidance is to provide banking supervisors with information about FX settlement risk and its management that they should take into account when assessing a bank's policies and procedures. Establishing and implementing proper risk management policies can be a major task for a bank and it is likely that not all banks will have completed this task yet. However, understanding and recognition of FX settlement risk has increased significantly in recent years, not least because of the work of the Committee on Payment and Settlement Systems (CPSS) of the Bank for International Settlements, in particular their reports, *Settlement Risk in Foreign Exchange Transactions* (March 1996) and

*Reducing Foreign Exchange Settlement Risk: A Progress Report* (July 1998).<sup>1</sup> All banks should therefore be expected to have a good understanding of FX settlement risk and to have formulated clear and firm plans for how to manage it. Even if those plans have not yet been fully implemented, the process of doing so should be well underway.

4. This guidance was drawn up in close consultation with the CPSS. It has also benefited from comments received on the consultative draft issued in July 1999.

## **II The nature of FX settlement risk**

5. FX settlement risk clearly has a credit risk dimension. If (as is usually the case under current market practices) a bank cannot make the payment of the currency it sold conditional upon its final receipt of the currency it bought, it faces the possibility of losing the full principal value of the transaction. It is true that, in practice, the majority of FX settlement failures arise for operational or other routine reasons, in which case the bank does in due course receive the currency it has purchased. Nevertheless, the risk exists that the counterparty will default outright and the principal will be lost. **Banks therefore should treat FX exposures as being equivalent to other credit exposures of the same size and duration.**<sup>2</sup> Moreover, as discussed below, they need to take into account the fact that standard settlement practices mean that this exposure is not necessarily an intraday phenomenon: exposures frequently last overnight and can last for several days.

6. FX settlement risk also has an important liquidity risk dimension. Even temporary delays in settlement can expose a receiving bank to liquidity pressures if unsettled funds are needed to meet obligations to other parties. Such liquidity exposure can be severe if the unsettled amounts are large and alternative sources of funds must be raised at short notice in turbulent or unreceptive markets.

7. FX settlement risk has other dimensions as well. For example, there is legal risk – i.e. the risk that legal difficulties may exacerbate the credit or liquidity risk facing the bank as a result of a settlement failure. In the case of foreign exchange deals, legal risk can be

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<sup>1</sup> These documents as well as other useful material related to foreign exchange settlement risk and other types of settlement risk are listed in the annotated bibliography provided in Appendix 3.

<sup>2</sup> It is worth noting that FX settlement risk is not intended to attract a minimum capital requirement under the new capital adequacy framework. Supervisors would be free to impose a charge for this, or other risks, under the supervisory review process and banks may wish to consider this exposure in their internal capital allocations. The proposed capital charge for operational risk is intended to take into account operational risk exposure arising from FX settlement.

complicated by the fact that settlement normally takes place in more than one jurisdiction. There is also a particularly important systemic risk dimension. As already noted, the size of some banks' FX exposures relative to their capital creates the real danger that a failure of one counterparty of a bank could lead to that bank's insolvency.

8. The scale and nature of FX settlement risk depends, in part, on the method of settlement. At the moment, the majority of deals are settled gross – i.e. each deal is settled individually through payments made via correspondent banks (or branches of the counterparty banks) in the currencies concerned. This guidance concentrates on the risks that arise from settling gross because a thorough understanding of how these risks should be managed is a pre-requisite for understanding other settlement methods.<sup>3</sup> At the moment, the principal alternative settlement method is to use bilateral netting. In the future it is likely that further settlement methods will also be available, including the FX settlement system being developed by CLS Bank. Later sections of the guidance look at some of the risk management implications of these alternative settlement methods.

### **III Senior management responsibilities**

9. A bank's procedures for managing its FX settlement risks should be commensurate with the range and scope of its activities. However, in all cases and regardless of the settlement method used, FX settlement risk management should begin at the highest levels of the organisation, with a policy on FX settlement risk from the bank's board of directors. This policy should be an integral and consistent part of the bank's overall policy towards counterparty risk. It should be regularly reviewed and, where necessary, modified to take account of new circumstances such as changes in the scale or nature of the bank's FX operations or in the method of settlement used.

10. Senior management should exercise appropriate oversight of settlement exposures. Although specific organisational approaches may vary across banks, FX settlement risk management should be integrated into the overall risk management process. Managing FX settlement risk involves many different functional areas of a bank, including trading, credit, operations, legal, risk assessment, branch management, and correspondent relations. In larger,

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<sup>3</sup> Note that the term "gross" is used here to indicate a process in which each FX deal is settled individually by traditional correspondent bank methods. It does not mean that any payment system used by the correspondent banks as part of this process is necessarily a gross settlement system.

more complex banks, counterparty exposures may also run across departments, branches and legal entities, and may encompass multiple product lines, such as lending and FX trading. Banks should have clear procedures for measuring and managing exposures that provide for the efficient aggregation of all components of credit risk toward a counterparty. This is a prerequisite for the proper functioning of the overall risk management process. Only senior management can effect the co-ordination necessary to achieve this. Management information systems should also support the integration of the necessary information.

11. Accordingly, senior management should ensure that they fully understand the FX settlement risks incurred by the bank and should clearly define lines of authority and responsibility for managing these risks. Adequate training should be provided to all staff responsible for the various aspects of FX settlement risk. Senior management and staff should understand that counterparty default is not so rare as to obviate the need for strong risk management. While defaults by major banks are uncommon, the extremely large FX trading exposures, including those that can last for several days (as discussed below), merit more prudent risk management than is currently found in many banks.

#### **IV Duration of FX settlement exposure**

12. FX-related payments generally are made in two primary steps: the sending of payment orders and the actual transmission of funds. It is important to distinguish between these two steps: the first is an instruction to make a payment, while the second involves an exchange of credits and debits across correspondent accounts and the accounts of the central bank of the currency involved.<sup>4</sup> The first step is normally effected one or two days before settlement date (although there are some variations according to currency and institution) while the second stage takes place on the settlement date itself.

13. A bank's FX settlement exposure runs from the time that its payment order for the currency sold can no longer be recalled or cancelled with certainty – *the unilateral payment cancellation deadline* – and lasts until the time that the currency purchased is received with finality. Note that this is the duration of the exposure. It says nothing about the probability of failure and thus the degree of risk faced by the bank during the period. Depending on the

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<sup>4</sup> Alternatively, final payment may be made by book-entry transfer if the two trading counterparties have the same correspondent.

information available to the bank about the creditworthiness of the counterparty or the status of the funds it is due to receive, its assessment of the probability of failure and thus the degree of risk may change during the time the exposure is outstanding. This is, of course, normal for any credit exposure.

14. To measure and manage their FX exposures, banks need to be certain when their unilateral cancellation deadline is for each currency. It might be expected that banks could cancel payment orders up until the moment before the funds are finally paid to a counterparty. However, correspondent and payment system practices, as well as operational and even legal arrangements, typically result in payment orders becoming effectively irrevocable significantly before the time of payment.

15. A key factor in determining the unilateral cancellation deadline is the latest time a correspondent can guarantee to satisfy a cancellation request. The documentation covering a correspondent's service agreement should identify this cancellation cut-off time. This documentation is particularly important because, in the event the bank wishes to cancel its payment instruction, the bank and its correspondent are likely to rely upon the terms and conditions stipulated in the agreement. However, in some cases banks may have no written agreement at all with their correspondent or the agreement may not specify a guaranteed cut-off time. Where this is the case, banks should negotiate with their correspondent; this may require a change in nature of the relationship between the bank and its correspondent, recognising that the two need to work together to manage risks effectively.

16. In assessing their unilateral payment cancellation deadlines, banks should be able to demonstrate that they can in practice identify and hold particular payments up to the cut-off times guaranteed by their correspondents, as internal processes and other practical factors may limit their ability to do so. In many cases, the effective unilateral payment cancellation deadline will be earlier than the guaranteed cut-off time - indeed, in some cases the unilateral payment cancellation deadline may even be earlier than the time the payment order is normally sent to the correspondent. These earlier times could occur, for example, if payment orders were normally processed automatically but cancelling an order required time-consuming manual intervention. Moreover, due to automated processing, a bank may not be able to stop one payment instruction without ceasing or disrupting all outgoing payment instructions. Because a bank's management is unlikely to want to suspend payments to their solvent counterparties (and face subsequent demands for compensation), an all or nothing capability to cease outgoing payment instructions should not be accepted as the ability to effect unilateral cancellation of payments to a single counterparty. Finally, some deadlines

quoted by correspondents may fall outside normal working hours, in which case the bank may need additional time to meet the deadline. Because of these and other factors, banks should consider testing their procedures with their branches and correspondents in simulations of emergencies in order to help determine the effective unilateral payment cancellation deadline.<sup>5</sup>

## V Measurement of FX settlement exposures

17. The actual duration of FX settlement exposure - namely, the interval from the unilateral payment cancellation deadline for the sold currency until final receipt of the bought currency - is generally referred to as the period of irrevocability. When trades are settled gross, the full face value of the trade is at risk during this period, which can last overnight and up to two or three full days. If weekends and holidays are included, the period of irrevocability – and consequent exposure – can exist for several more days.

18. A bank's *minimum* FX settlement exposure at a specified time includes the value of all outstanding trades where payment is irrevocable; it also includes any known failed receipts since, by definition, the fact the trade has failed to settle means the funds have not yet been received. Because the irrevocable period can last several days, this minimum measure of exposure may be equal to several days' worth of trades. In this situation, a bank might find itself in the position of paying a counterparty on one day when it had not been paid on the previous day(s).

19. A bank's measurement of its exposure also needs to take account of the process of reconciling incoming payments with expected receipts. The actual exposure of the bank ends when the bought currency is received with finality. However, in the interval between expected receipt and reconciliation, referred to as the period of uncertainty, the bank does not know whether it has received payments from particular counterparties and will therefore be acting in ignorance of any failed receipts. When measuring its exposure, a prudent bank will therefore assume that during this uncertain period the funds have not been received. Consequently, the *maximum* settlement exposure at a specified time equals the minimum exposure plus the value of all uncertain receipts at that time.

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<sup>5</sup> For example, the bank could attempt to cancel payment instructions (concerning payments set up specially for test purposes) which it had sent to its correspondent.

20. Note that the period of uncertainty only ends when a bank has positively confirmed that the funds have been received. Positive confirmation means that a bank not only has received information from its correspondents about the payments credited to its nostro accounts but also has processed that information to determine which trades have successfully settled and which, if any, have failed.<sup>6</sup> It is not enough for banks to measure their exposure on the basis that, provided they have no news of the counterparty having defaulted, it is safe for them to assume that the funds either have been or will be received. Until the receipt of the funds has been positively confirmed, there always remains the possibility that in fact they have not been received and that the counterparty will default.

21. Measuring FX settlement exposures requires a bank to identify explicitly both the unilateral payment cancellation deadlines and the reconciliation process times involved in each type of currency transaction. An exact measure of FX exposures has to recognise that the duration of exposures varies by currency pair and that a bank's exposures are likely to change during the day. Exact measurement has the advantage of avoiding overestimation as well as underestimation.<sup>7</sup> Nevertheless, the process involved is relatively complex and so, for operational and system reasons, most banks do not measure their exposures exactly. Instead various estimation methods are used. In particular, many banks define and measure their daily settlement exposures as the total receipts coming due on settlement day.

22. Estimation techniques can be appropriate – but only if they do not significantly underestimate exposures. However, in practice simple estimation techniques frequently do understate settlement exposures. One problem is that even where exposures last for less than 24 hours, this period may overlap more than one calendar day. For example, the period may start during the evening of the day before settlement and run until late afternoon of the settlement day; in this case, estimating the daily exposure as the receipts due on the settlement day could underestimate the actual exposure late in the day. Moreover, as noted in paragraph 18 above, exposures often last more than one day. Simple approximation methods for improving this technique, such as using multiples of daily trades, may not sufficiently account for variations in the value of daily trades.

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<sup>6</sup> It is not unusual for the reconciliation process to take place some considerable time after information is received from a correspondent. (For example, the bank may receive the information late on the settlement day but not process the information until the next working day.) Banks need also to ensure that payments shown as being credited to their nostro accounts have been credited with finality, rather than as provisional funds (e.g. pending final settlement within a payment system).

<sup>7</sup> Overestimation has disadvantages: it may lead to inefficient use of counterparty credit limits or to excessive expansion of credit limits to offset the overestimate. However, underestimation is clearly a more serious problem.

23. Where estimation techniques are used, management should therefore be able to demonstrate clearly how settlement exposure is measured, and that, even in abnormal circumstances, the estimation techniques will not significantly underestimate the exposure. Even estimation techniques require a bank to have a thorough understanding of both the unilateral payment cancellation deadlines and the reconciliation process times involved in each type of currency transaction.

24. Finally, it is critical that banks' measurements of FX settlement exposures and associated risks are integrated into their overall risk measurement and management processes. In particular, banks have increasingly adopted consolidated risk measurement and capital allocation methodologies, a trend that supervisors have strongly supported. Where such methodologies are used, appropriate measures of FX settlement risk should be included so that internal capital allocations properly reflect the risks associated with this activity.

## **VI Setting and using limits**

25. Banks should ensure that settlement exposures to counterparties are subject to prudent limits. FX settlement exposures should be subject to an adequate credit control process, including credit evaluation and review and determination of the maximum exposure the bank is willing to take with a particular counterparty. Through this process, an FX settlement limit should be established for each counterparty. The FX settlement exposure limit should be subject to the same procedures used to devise limits on other exposures of similar duration and size to the same counterparty. For example, in cases where the FX settlement exposure to a counterparty lasts overnight, the limit might be assessed in relation to the bank's willingness to lend funds to its counterparty on an overnight basis. Limits should be based on the level of credit risk that is prudent and should not be set at an arbitrary, high level just to facilitate trading with a counterparty.

26. The limits applied by a bank to its FX settlement exposures should be binding – i.e. FX deals should not be struck that would cause counterparty limits to be exceeded. Any planned excesses should be subject to approval by the appropriate credit management personnel in advance of the excess occurring. However, unplanned excesses may sometimes occur. This may be because, when the deal is struck, the headroom apparently available under a limit has not yet been reduced to reflect other deals recently struck. Or it may be because, when the time comes for the deal to be settled, unexpected events (such as the failure of other

transactions to settle) cause exposures to be higher than planned. Banks should take steps to minimise these possibilities. Exposure measures should be updated promptly when new deals are struck or when events (such as fails) mean that the exposures from existing trades last longer than expected. Effective monitoring is crucial to the management of FX settlement risk, and banks with large exposures should have systems that enable them to monitor developments in real-time (or close to real-time) in order to ensure that these exposures do not exceed settlement limits. A bank may want to put additional emphasis on those exposures that are particularly large or are with less-creditworthy counterparties or where there has been a series of fails that may indicate an underlying credit-worthiness problem. However, if, despite these precautions, unauthorised excesses do still occur, a review by the credit management personnel should take place shortly thereafter so that any necessary corrective action can be taken.

## **VII Procedures for managing fails and other problems**

27. Operational errors are the most common source of fails. While such mistakes may be inadvertent and corrected within a reasonable time, they may in some cases be indicative of more fundamental problems, including credit problems, and so banks should have procedures for quickly identifying fails and taking appropriate action. Such action should normally involve informing the credit department, so that a judgement can be made about the seriousness of the problem. Because a fail represents continued exposure to the counterparty for the full principal value of the trade, banks should include fails in their measures of current and expected exposure (as noted in paragraph 18 above). Banks may also need to take steps to obtain the funds due and to try to avoid recurrences.

28. When reacting to a fail or to another potential problem with the settlement of an FX deal, banks need to strike a balanced approach. If there appears to be an underlying credit-worthiness problem, the bank may decide that it is prudent to reduce its limit for that counterparty. In more extreme cases, it may decide that, to protect itself from settlement risk, it needs to suspend issuing payment instructions for outstanding deals with that counterparty or to cancel existing payment instructions (if possible). However, failure to pay could have serious consequences; it could constitute a breach of contract by the bank and may cause liquidity problems for the counterparty. Such action should thus only be taken when, after a

careful but prompt review of the circumstances, the bank's senior management judges that the situation warrants it.

## **VIII Contingency planning**

29. Contingency planning and stress testing should be an integral part of the FX settlement risk management process. Contingency plans should be established to include a broad spectrum of stress events, ranging from internal operational difficulties to individual counterparty failures to broad market related events. Adequate contingency planning in the FX settlement risk area includes ensuring timely access to key information, such as payments made, received or in process, and developing procedures for obtaining information and support from correspondent institutions. An institution should also have a contingency plan in place to ensure continuity of its FX settlement operations if its main production site becomes unusable. This plan should be documented and supported by contracts with outside vendors, where such vendors provide services to the bank that are necessary either to the bank's normal FX settlement or to its contingency plans. Because in many cases the action taken will be similar, contingency planning for FX settlement problems should be co-ordinated with the planning for other problems (such as payment system or trading room failures). Contingency plans should be tested periodically.

## **IX Improving the management of FX settlement exposures**

30. Banks should actively manage their exposures. There are various steps banks can take to reduce the duration or size of the settlement exposures relating to their FX deals. The duration of exposures can be reduced by improving unilateral payment cancellation deadlines by, for example, negotiating better cancellation cut-off times with correspondents and improving internal processing. It is important to note that banks should not simply regularly delay sending payment instructions to their correspondents as a way of improving their periods of irrevocability. Doing so without the correspondents' consent could increase the correspondents' operational risks and thus the risk that payment instructions are incorrectly processed. Instead, banks should seek to negotiate explicit cancellation cut-off times with their correspondents. Banks need to have realistic expectations of what correspondent banks can be expected to achieve, since later cancellation cut-off times have operational and

liquidity consequences for the correspondent. Banks also need to be aware of the possible liquidity risk in payment systems if late cut-off times cause FX-related payments to be concentrated towards the end of the settlement day, adversely affecting system liquidity.

31. Better management of exposures can also be achieved by identifying receipts sooner, thereby bringing the maximum measure of exposure close to the minimum. To reduce the amount of time it takes to identify final or failed receipts, banks will need to consider improving both arrangements for receipt of information from correspondents and the time they conduct their own reconciliations.

32. Appropriately managed collateral arrangements and legally sound netting agreements (see below) are also important risk management tools that can reduce the amount of a bank's exposure to a particular counterparty for a particular level of trading.

## **X Use of bilateral netting**

33. Banks can reduce the size of their counterparty exposures by entering into legally binding agreements to net settlement payments bilaterally.<sup>8</sup> Legally binding payment netting arrangements permit banks to offset trades against each other so that only the net amount in each currency is paid or received by each institution. Such payment netting arrangements are contemplated in the industry standard bilateral master agreements covering FX transactions.

34. Depending on trading patterns, bilateral payment netting can significantly reduce the value of currencies settled. It also reduces the number of payments to one per currency either to or from each counterparty. Bilateral payment netting is most valuable when the counterparties have a considerable two-way flow of business; as a consequence it may only be attractive to the most active banks. To take advantage of risk reducing opportunities, banks should be encouraged to establish procedures for identifying payment netting opportunities.

35. Use of bilateral payment netting requires some modification to the method of measuring settlement exposures explained earlier. When bilateral payment netting is used, all the transactions with a particular counterparty due to settle on that day have to be considered together: the bank will make a single payment to the counterparty in each of the currencies

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<sup>8</sup> Netting of payment obligations should not be confused with 'close-out netting', which requires counterparties to settle on a net basis all contracted but not yet due obligations immediately upon the occurrence of a defined event, such as the appointment of a liquidator to one of the counterparties. Although close-out netting may be a useful part of a bank's overall risk management, it is not discussed further here as it does not, by itself, reduce routine FX settlement exposures.

where it has a net debit position, and receive a single payment in each of the currencies where it has a net credit position. The *maximum value* of the resulting settlement exposure is simply equal to the sum of the amounts due to be received from the counterparty. However, measuring the *actual duration* of the exposure is more complicated because netted transactions result in a set of payments in a number of currencies, no two of which can simply be paired to calculate the period of irrevocability. Rather, the exposure will build up to its maximum value as the cancellation deadline for each of the net debit currencies paid is reached, and will fall as each of the net credit currencies is received. Any method of measurement – whether an exact measure or an approximation – needs to make appropriate allowance for this.

36. Moreover, to allow exposures to be measured on a net basis, the legal basis for payment netting arrangements should be sound. In particular, banks should ensure that a netting arrangement is legally enforceable in all relevant jurisdictions.

37. Some banks use informal payment netting - i.e. where there is no formal netting contract between the counterparties. In this instance, the back offices of each counterparty confer by telephone before settlement and agree to settle only the net amount of the trades falling due. Since there may not be a sound legal basis underpinning such procedures, banks should ensure that they fully understand and appropriately manage the legal, credit, and liquidity risks of this practice. In particular, counterparty exposures should be treated on a gross basis for risk management purposes unless the bank has obtained clear legal advice that the informal payment netting is legally sound. Additionally, the practice and associated risks should be described in the bank's policy and procedures.

38. While bilateral netting arrangements can significantly reduce FX settlement risk, they are usually not capable of removing credit risk entirely. In addition, significant liquidity, legal and operational risks may remain. For example, if, because of operational problems, transactions that had been scheduled to be settled through a netting arrangement had unexpectedly to be settled gross, a bank might not have the liquidity to settle those transactions on a timely basis.

## **XI Alternative arrangements for FX settlement risk reduction**

39. Additional options may soon be available to reduce FX settlement risk. For example, a major project currently underway is the creation of CLS Bank, a private sector

multicurrency facility for settling FX transactions that involves payment-versus-payment functionality. The achievement of payment-versus-payment in the CLS Bank design should significantly reduce the principal risk associated with FX settlement, which is the most significant aspect of FX settlement risk. In the future, it is also possible that other options for reducing FX settlement risk will become available.

40. Banks with significant FX settlement exposures should give strong consideration to using such risk-reducing arrangements, either by participating in them directly or by taking advantage of third-party services. In evaluating whether to do this, banks should carefully assess the costs associated with the exposures, including both expected losses and the cost of economic capital associated with unexpected losses. While ultimately the decision to make use of risk-reducing arrangements should be based on the balance of all costs and benefits, it is particularly important that banks do not underestimate the benefits of risk reduction by assuming that sudden bank failures are impossible.

41. Banks that choose to participate in risk-reducing arrangements, such as CLS Bank, should recognise that such participation can have implications for a number of different parts of their organisations beyond the areas directly associated with payments processing. Accordingly, banks should develop an overall process for monitoring and assessing these implications (e.g. on trading and funding practices) and for ensuring that they are ready to cope with the changes that may result from their participation.

42. In addition, banks should understand that, while risk-reducing arrangements are intended to significantly reduce important settlement risks, they may not eliminate all such risks. Thus, banks using such arrangements should have a thorough understanding of them and of the remaining risks they face - for example, liquidity, legal and operational risks. Moreover, even if banks use alternative arrangements for deals with major counterparties, they are likely to continue to use the traditional gross settlement method for certain counterparties and currencies. Therefore, banks should incorporate their use of alternative settlement arrangements into measures of and limits on FX settlement exposures, understanding that use of such arrangements does not eliminate the need for all such tools.

## **XII Internal audit**

43. Banks should have in place adequate internal audit coverage of the FX settlement process to ensure that operating procedures are adequate to minimise settlement risk. A

bank's board of directors – either directly or through its audit committee - should ensure that the scope and frequency of the FX settlement internal audit programme is appropriate to the risks involved.

44. The board of directors or its audit committee should ensure that audit reports are distributed to appropriate levels of management for information and so that timely corrective action can be taken. Management should detail, in writing, the action taken. The board of directors or its audit committee should regularly review this and consider any outstanding issues. Where appropriate it should ensure that a follow-up audit is undertaken.

45. When audit findings identify areas for improvement in the FX settlement area, other areas of the bank on which this may have an impact should be notified. This could include credit risk management, reconciliations/accounting, systems development, and management information systems. In automated settlement processing, the internal audit department should have some level of specialisation in information technology auditing, especially if the bank maintains its own computer facility.

### **XIII A bank's responsibilities to its counterparties**

46. The emphasis in this guidance has been on the steps banks take to manage the settlement risk that they themselves face. However, settlement risk is a two-way process – a bank also needs to be aware that its own behaviour affects the settlement risk faced by its counterparties. As discussed in paragraph 28 above, banks should react in a balanced and considered way to any perceived counterparty problems. Banks should also minimise the possibility that, as part of their routine processing of FX settlements, they are the cause of settlement failures. For example, banks may want to consider whether, given the size and pattern of their transactions in the currencies concerned, they have enough liquidity on their nostro accounts to avoid payments being delayed because of shortages of funds. Further, the use of standardised settlement instructions may reduce the risk that payments are unintentionally mis-routed, particularly when there are changes to those instructions. Effective communication can also help to minimise the adverse impact of problems; it may therefore be helpful for banks to ensure they have procedures for informing key counterparties when significant operational problems arise. By taking such steps to avoid routine, operational fails, or to minimise their impact, banks will make it easier to identify those cases where there is a more serious underlying problem.

## **XIV The role of supervisors<sup>9</sup>**

47. Foreign exchange settlement risk is a dimension of counterparty risk at banks. While a bank's board of directors and senior management remain responsible for the management of FX settlement risk, supervisors have an interest in ensuring that banks measure, monitor and control FX settlement risk appropriately. FX settlement losses can occur with any FX trading counterparty failure, but FX settlement exposures are particularly vulnerable to loss in connection with systemic disturbances, such as when counterparty credit quality declines precipitously or credit and liquidity concerns intensify. FX settlement exposures are often concentrated among the largest global banks and losses could therefore be substantial in the event of the failure of a major global bank. Further, FX settlement losses are often seen by market participants as harbingers of more severe credit problems in the financial system, inducing caution among counterparties and adversely affecting bank liquidity and the flow of business activity. While such systemic disturbances are rare, the potential losses from FX settlement risk can be very substantial, because of the exchange of principal and the large volume of transactions.

48. Supervisors should require that banks engaging in FX trading have appropriate methods of managing FX settlement exposures consistent with the guidelines in this report. Supervisors should expect all banks to measure FX settlement risk, set binding limits for all counterparties, and monitor closely limit excesses and unusual settlement activity. Supervisors should expect a bank to use methods commensurate with the range and scope of its activities and assess such methods as part of their ongoing supervisory activities. Supervisors should consult with the internal auditor to determine the adequacy of the risk assessment methodology used by the institution. In cases where supervisors determine that a bank's FX settlement risk management is not adequate or effective for that bank's specific risk profile, they should take appropriate action.

49. Supervisors can step up supervisory attention to this area by inquiring about and evaluating a bank's improvements to its FX settlement process. Based on the work of the Committee on Payment and Settlement Systems (CPSS), banks clearly can make substantial further improvements in their FX settlement practices to control and reduce FX settlement risk. Thus, supervisors should place special emphasis on encouraging and monitoring

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<sup>9</sup> In some cases supervisors may make use of the work of external auditors to ensure the described functions are carried out.

reductions in the deadlines for irrevocable payments before payment date and in the time required to reconcile settlements. In addition, supervisors should focus on whether a bank has fully and carefully evaluated the potential risk reductions that could be gained through participation in initiatives to reduce FX settlement risk, including netting and other risk-reducing arrangements.

50. To ensure that FX settlement risk is properly managed, supervisors may find some form of on-site review helpful. The two CPSS studies on FX settlement risk mentioned earlier (see paragraph 3) provide very helpful background to supervisors. In conducting on-site reviews, supervisors may also find the attached questions helpful.

51. The most effective way to supervise FX settlement risk is to evaluate a bank's risk management process, while, over time, expecting substantial further improvements in risk management techniques. Such improvements can be monitored using the benchmarks established in the two CPSS studies. If after some time FX settlement risk exposures remain at levels viewed by supervisors as higher than necessary given the sound practices in these guidelines, supervisors could consider other supervisory tools they have available. Those tools include imposing large exposure limits on FX settlement exposures and possibly requiring a bank to hold additional capital to support large FX settlement exposures.

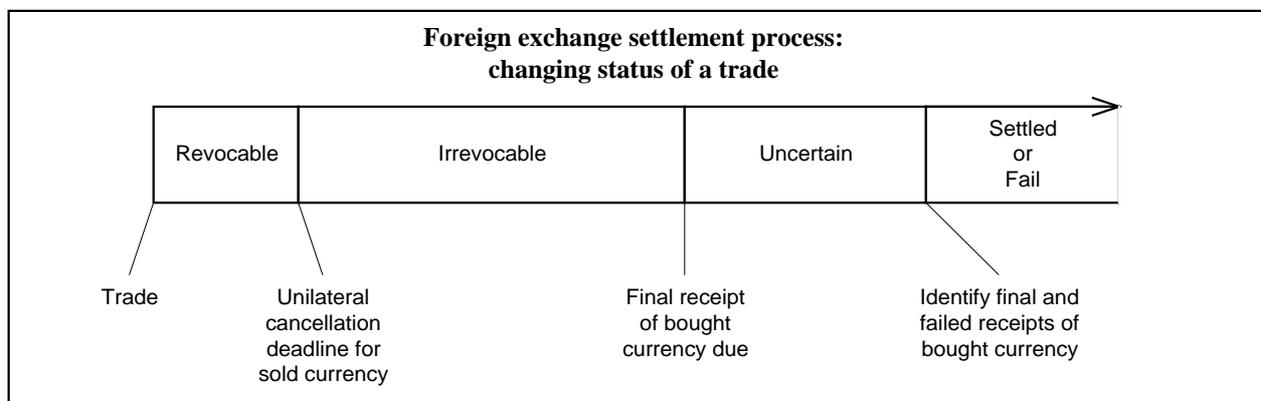
52. The cross-border nature of the settlement process makes it imperative that supervisors share information about FX settlement risk problems or concerns at individual institutions and within marketplaces. Sharing information about how a FX settlement problem is being addressed can help prevent the spread of settlement distress to additional markets.

## Appendix 1

### Key FX Settlement Risk Concepts

#### Definition of Foreign Exchange Settlement Exposure

*An institution's actual exposure – the amount at risk – when settling a foreign exchange trade equals the full amount of the currency purchased and lasts from the time a payment instruction for the currency sold can no longer be cancelled unilaterally until the time the*



*currency purchased is received with finality.*

Although settling a trade involves numerous steps, from a settlement risk perspective a trade's status - from the time it is executed until the time it is settled - can be classified according to five broad categories:

<b>Status</b>	<b>Description</b>
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<i>Revocable:</i>	The institution's payment order for the sold currency either has not been issued or may be unilaterally cancelled without the consent of the institution's counterparty or any other intermediary. The institution faces no current settlement exposure for this trade.
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<i>Irrevocable:</i>	The institution's payment order for the sold currency can no longer be cancelled unilaterally either because it has been finally processed by the relevant payments system or because some other factor (e.g. internal procedures, correspondent banking arrangements, local payments system rules, laws, etc.) makes cancellation dependent upon the consent of the
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counterparty or another intermediary; the final receipt of the bought currency is not yet due. In this case, the bought amount is clearly at risk.

*Uncertain:* The institution's payment instruction for the sold currency can no longer be cancelled unilaterally; receipt of the bought currency is due, but the institution does not yet know whether it has received these funds with finality. In normal circumstances, the institution expects to have received the funds on time. However, since it is possible that the bought currency was not received when due (e.g. owing to an error or to a technical or financial failure of the counterparty or some other intermediary), the bought amount might, in fact, still be at risk.

*Fail:* The institution has established that it did not receive the bought currency from its counterparty. In this case the bought amount is overdue and remains clearly at risk.

*Settled:* The institution knows that it has received the bought currency with finality. From a settlement risk perspective the trade is considered settled and the bought amount is no longer at risk.

### **Additional Terms**

*Unilateral Payment Cancellation Deadline:* The time beyond which an institution can no longer stop a payment without the permission of a third party.

*Minimum Measurement of Settlement Exposure:* The sum of (1) exposures outstanding for trades with status irrevocable and (2) any known failed receipts.

*Maximum Measurement of Settlement Exposure:* The sum of (1) exposures outstanding for trades with status irrevocable, (2) exposures outstanding for trades with status uncertain and (3) any known failed receipts.

## **Appendix 2**

### **Possible Questions for On-site Reviews**

These questions are intended only as a broad guide for supervisors and may need to be modified depending on the bank concerned.

#### **1. Overall management**

Does responsibility for the management of FX settlement risk rest at a sufficiently senior level of management? Does senior management exercise appropriate oversight of FX settlement exposures?

Is the management of FX settlement risk adequately integrated into overall risk management of the bank?

Are there clear lines of responsibility within the bank? Is there adequate co-ordination between different functions and locations of the bank? If conflicts arise (for example, over the use of limits), do appropriate means to resolve them exist?

Are FX settlement risks fully understood by senior management and all those involved? Is adequate training in place to achieve this?

#### **2. Measurement**

Is the bank's measurement of risk based on a full understanding of the relevant factors, including the concepts of the unilateral cancellation time and the reconciliation time and how these affect the maximum and minimum measures of the bank's exposure?

Has the bank taken appropriate steps to ensure reasonable certainty about its unilateral cancellation deadline?

Is the correspondent's cut-off time documented? Is this a contractual commitment rather than on a best-efforts basis? Has the cut-off time been tested?

Has the bank given adequate consideration for the time needed to complete internal procedures when it wants to cancel a payment instruction? Is its cancellation deadline based on an ability to hold back individual payments at that time rather than to hold all payment instructions? Has allowance been made for cases where the correspondent's cut-off is out of normal hours? Have the internal procedures been tested?

Has the bank taken appropriate steps to ensure reasonable certainty about its reconciliation time? Has adequate consideration been given to the time needed to carry out the reconciliation once the information on payments credited to its nostro accounts has been received from its correspondents? Are procedures in place to cover situations when information from the correspondent bank is late? Are procedures in place to ensure that any failed transactions are included promptly in the bank's measure of its exposure?

Does the bank's measurement make appropriate allowance for variations in the cancellation and reconciliation times according to currency?

Where the bank uses an approximate measure of its exposure, does this measure avoid any significant underestimation?

### **3. Setting and using limits**

Are the bank's settlement exposures subject to an adequate credit control process including credit evaluation and review and determination of the maximum exposure the bank is willing to take with a particular counterparty?

Are the limits mandatory? Is monitoring effective? Are excesses subject to approval by the appropriate credit management personnel in advance of the excess occurring or, if an unauthorised excess takes place, shortly afterwards?

Are these processes the same as those used to set and apply limits on other exposures of similar duration and size to the same counterparties?

### **4. Identifying and managing fails**

Does the bank have appropriate procedures for promptly identifying fails, informing the credit department, initiating attempts to obtain the funds, identifying and reviewing the nature of the problem and taking steps to avoid its recurrence?

### **5. Understanding the implications of techniques to manage exposures**

Where the bank is using methods to reduce the size of its exposures (such as collateral arrangements, netting, derivative instruments or specialised settlement mechanisms) has the bank taken the necessary steps to ensure that the methods are legally robust and that their implications for FX settlement risk, including any residual risks, are fully understood and allowed for in the bank's risk management?

**6. Contingency planning**

Has the bank drawn up contingency plans for possible disruptions to the settlement of FX transactions? Are the plans regularly tested?

**7. Internal audit**

Does the bank have adequate internal audit coverage of the FX settlement process?

## Appendix 3

### Annotated Bibliography

Settlement risk can take many forms. This guidance is concerned with the risks associated with settling foreign exchange transactions, where the settlement risk is one of various forms of so-called "exchange-of-value" settlement risk. Exchange-of-value risk is a risk faced by the counterparties to a transaction, and arises from the need for these counterparties to exchange one item of value for another.

Exchange-of-value settlement risks can occur in the settlement of almost any kind of transaction. In the case of FX settlement risk, the exchange is of one currency for another. In many other financial markets – such as securities markets, for example – a key form of exchange-of-value settlement risk involves the exchange of financial instruments against money. In each case, the particular characteristics of the market concerned and how its deals are settled need to be understood in order that the settlement risk involved can be managed properly.

The following publications provide more information relevant to the exchange-of-value settlement risks arising in various financial markets.

#### Foreign Exchange Settlement

*Reducing Foreign Exchange Settlement Risk: A Progress Report*, Committee on Payment and Settlement Systems, BIS, July 1998.

- Provides an update on the private sector's efforts to reduce foreign exchange settlement risk.
- Reaffirms and strengthens the strategy of the G10 central banks toward foreign exchange settlement risk reduction.

*Settlement Risk in Foreign Exchange Transactions*, Committee on Payment and Settlement Systems, BIS, March 1996.

- Analyses existing arrangement for settling foreign exchange trades.
- Makes risk reducing recommendations.
- Identifies avenues for co-operation with the private sector and for advancing the cause of foreign exchange settlement risk reduction.

***Reducing Foreign Exchange Settlement Risk***, The New York Foreign Exchange Committee, October 1994.

- Presents the results of a survey of foreign exchange market participants to determine common settlement procedures.
- Suggests ways of defining and measuring settlement risk.
- Offers a series of recommendations to reduce settlement exposures.

***Central Bank Payment and Settlement Services with Respect to Cross-Border and Multi-Currency Transactions***, Committee on Payment and Settlement Systems, BIS, September 1993.

- Identifies and promotes a common understanding of the advantages and disadvantages of different payment and settlement services that central banks might offer.
- Highlights how changes in certain features of home-currency payments systems can influence the risk and efficiency of international settlements.
- Emphasises the scope and need for private sector efforts to reduce risk and increase efficiency in the settlement process.

### **Payment System Standards**

***Core Principles for Systemically Important Payment Systems*** (Parts 1 and 2), Committee on Payment and Settlement Systems, BIS, July 2000.

- Sets out ten core principles that systemically important payment systems should meet.
- Sets out four responsibilities of the central bank in applying the core principles.
- Provides guidance on the implementation of the core principles and responsibilities.

***Report of the Committee on Interbank Netting Schemes of the Central Banks of the Group of Ten Countries (Lamfalussy Report)***, Committee on Payment and Settlement Systems, BIS, November 1990.

- Analyses the policy implications of cross-border and multi-currency netting arrangements.
- Makes policy recommendations with respect to minimum standards for netting systems.

- Analyses the impact of netting on credit and liquidity risks and on the level of systemic risk.
- Advances principles for co-operative central bank oversight of netting systems

### **Derivatives Settlement**

*ISDA Guidelines for Collateral Practitioners*, International Swaps and Derivatives Association, Inc., 1998.

- Useful as a reference source for institutions managing collateral for derivatives transactions.
- Describes the basic legal issues underlying collateral arrangement for privately negotiated derivatives transactions.
- Describes and analyses the settlement risks associate with collateralised derivatives transactions.

*OTC Derivatives: Settlement Procedures and Counterparty Risk Management*, BIS, September 1998.

- Provides a comprehensive survey and analysis of the practices and procedures that participants in over-the-counter derivatives markets use to manage their counterparty risks.
- Identifies weaknesses in practices that appear to exacerbate counterparty risks significantly or even possibly pose risks to the financial system systemically.
- Recommends changes in practices, including new services, that could mitigate the risks and weaknesses identified.

*Clearing Arrangements for Exchange-Traded Derivatives*, Committee on Payment and Settlement Systems, BIS, March 1997.

- Describes and analyses clearing arrangements for exchange traded derivatives in the G10 countries.
- Discusses the sources and types of risks to clearing houses and the risk management safeguards that clearing houses employ to manage those risks.
- Identifies several specific sources of potential vulnerability in clearing house risk management systems.
- For each weakness identified, points out methods for strengthening clearing arrangements.

## **Securities Settlement**

*Disclosure Framework for Securities Settlement Systems*, Committee on Payment and Settlement Systems (BIS) and International Organisation of Securities Commissions, February 1997.

- Provides a standard format for reporting a securities settlement system's operation and its allocation of risk.
- Intended as a tool for system operators and participants to use in discussing the risks associated with securities settlement arrangements.
- Assists system operators and participants in gaining a clearer understanding of the rights, obligations and exposures associated with securities settlement systems.

*Cross-Border Securities Settlements*, Committee on Payment and Settlement Systems, BIS, March 1995.

- Examines the channels that market participants use to settle cross-border securities transactions and discusses the utilisation of the various channels by different types of traders.
- Identifies and analyses the risks associated with each of the major settlement channels.
- Considers the implications of cross-border settlement arrangements for central bank policy objectives.

*A Report on Cross-Border Risks*, Payments Risk Committee, Securities Settlement Sub-Committee, March 1995.

- Pinpoints key settlement attributes as applied by specific settlement systems.
- Analyses six risks in cross-border activity.
- Recommends settlement practice improvements and suggests changes to universal risk reduction techniques.
- Makes best practice recommendations.

*Delivery Versus Payment in Securities Settlement Systems*, Committee on Payment and Settlement Systems, BIS, September 1992.

- Analyses and discusses the types and sources of financial risk in the settlement of securities transactions.

- Identifies and describes three possible approaches to achieving delivery versus payment.
- Identifies several risk management issues common to all three approaches and common safeguards that may be employed to reduce risk.
- Considers whether the standards for the design and operation of cross-border and multi-currency netting and settlement schemes that were developed in the Lamfalussy Report also provide a useful framework for evaluating the implications of the design and operation of securities settlement systems for central bank policy operations.

*Clearance and Settlement Systems in the World's Securities Markets*, Group of Thirty, March 1989.

- Makes nine recommendations for improving the working of world securities markets through the adoption of sound practices and standards.
- Proposals are designed to achieve the following objectives:
- Match trades by the day after trade date (T+1).
- Settle trades on a continuous basis, and by T+3.
- Exchange value for value on a consistent basis.
- Improve efficiency by using depositories, netting mechanisms, and standard numbering systems whenever appropriate.

### **Relevant Web Sites**

***Bank for International Settlements:*** <http://www.bis.org>

A source of many publications relating to all aspects of settlement risk.

***International Finance & Commodities Institute:*** <http://risk.ifci.ch>

Attempts to impose a logical order to the wide universe of on-line regulatory documents concerning risk. Definitions and discussion.

***International Swaps & Derivatives Association, Inc.:*** <http://www.isda.org>

Significant source of information about the settlement of derivatives transactions.

***Payments Risk Committee:*** <http://www.ny.frb.org/prc>

Private sector group in New York that identifies and analyses issues of mutual interest related to risk in payments and settlement systems.