SUPERVISORY GUIDANCE
FOR MANAGING SETTLEMENT RISK
IN
FOREIGN EXCHANGE TRANSACTIONS

Consultative paper issued by the
Basel Committee on Banking Supervision

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of the Basel Committee on Banking Supervision

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Supervisory Guidance for Managing Settlement Risk in Foreign Exchange Transactions

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, given the size of the foreign exchange market, for many banks FX transactions form the greatest source of settlement risk exposure. For large banks, FX transactions can involve credit exposures amounting to tens of billions of dollars each day, and in some cases, exposures to a single counterparty in excess of an institution's capital.

2. 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. However 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. Finally, FX settlement risk also has a wider systemic risk dimension.

3. As with other forms of risk, the development of counterparty settlement limits and the monitoring of exposures against these limits is a critical control function and should form the backbone of a bank's FX settlement risk management process. FX settlement risk should be managed through a formal and independent process with adequate senior management oversight and should be guided by appropriate policies, procedures and settlement exposure limits. FX settlement risk measurement systems should provide appropriate and realistic estimates of settlement exposures on a timely basis.

4. This guidance builds on the work completed by the Committee on Payment and Settlement Systems 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).[1]

Invitation to comment

The Basel Committee is issuing this paper for consultation. Comments should be submitted no later than 30 November 1999. The Committee intends to release a final version of the paper once all comments have been considered. Comments should be sent to:

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[1] 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.

Senior management responsibilities

5. 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, FX settlement risk management should begin at the highest levels of the organisation, with senior management exercising 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 the risk associated with settling transactions involves many different functional areas of a bank, including trading, credit, operations, legal, risk assessment, branch management, and correspondent relations. In larger, more complex banks, counterparty exposures may also run across departments 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.

6. 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. In ensuring that senior management and staff fully appreciate FX settlement risk, it should be made clear that counterparty default is not so rare as to eliminate 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 three days or more (as discussed below), merit more prudent risk management than is currently found in many banks.

Duration of FX settlement exposure

7. 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.[2] 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.

8. 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. This period can be lengthy because of the time needed to cancel payment orders. It might be expected that banks could retrieve and 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

[2] Alternatively, final payment may be made by book-entry transfer if the two trading counterparties have the same correspondent.

payment orders becoming effectively irrevocable significantly before the time of payment. Indeed, in some cases the unilateral payment cancellation deadline may even be earlier than the time the payment order is sent.[3]

9. Because the unilateral payment cancellation deadline is the key parameter in determining the duration of FX settlement risk exposure, the documentation covering a correspondent's service agreement should identify the latest time the correspondent can guarantee to satisfy a cancellation request. However, this is frequently not the case. This documentation is particularly important because, in the event of a dispute, the bank and its correspondent are likely to rely upon the terms and conditions stipulated in the agreement, including this cancellation cut-off time.

10. In assessing their unilateral payment cancellation deadlines, banks should be able to demonstrate that they can in practice identify and hold particular payments by the cut-off times indicated 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 cut-off time guaranteed by the correspondent. For example, due to automated processing, a bank may not be able to immediately stop a payment instruction from being issued. In other cases, it 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) due to the problems of a single counterparty, an all or nothing capability to cease outgoing payment instructions should not be accepted as the ability to effect unilateral cancellation. Some deadlines quoted by correspondents may also fall outside normal working hours, in which case the bank may need additional time to meet the deadline. To help determine the effective time, banks should consider testing their procedures with their branches and correspondents in simulations of emergencies.

Measurement of FX settlement exposures

11. The interval from the unilateral payment cancellation deadline for sold currency until final receipt of the bought currency is due is generally referred to as the *period of irrevocability*. 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. A bank's *minimum FX settlement exposure* at a specified time is equal to the value of all outstanding trades where payment is irrevocable (plus any known failed receipts). Since 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).

12. The process of reconciling incoming payments with expected receipts also affects the measurement of exposure. 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

[3] This could occur, for example, if payment orders were normally processed automatically whereas cancelling an order required time-consuming manual intervention by the bank and its correspondent bank.

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. On the basis of this maximum measure, is it even more likely that a bank will at any time be exposed to more than one day's trades. When calculating its maximum exposure, a bank needs to take into account the fact that the period of uncertainty ends not when it receives information from its correspondent banks about the payments credited to its nostro accounts but when it has processed that information to determine which trades have successfully settled and which, if any, have failed – which may be considerably later. For example, the bank may receive the information late on the settlement day but not process the information until the next working day. Only when the bank has identified that trades have indeed successfully settled should it deduct them from its measure of exposure.

13. The measurement of 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 accurate 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. Accurate measurement has the advantage of avoiding overestimation as well as underestimation.[4] Nevertheless, for operational and system reasons, most banks do not measure their exposures accurately. 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. Such simple measures can be appropriate if they are used properly – i.e. if they do not lead to underestimation. However, in practice estimation techniques frequently do understate settlement exposures, which, as noted in paragraph 12 above, often last more than one day.[5] Moreover, 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 or for the appropriate timing of the settlement process across different currencies and thus can still result in underestimation of exposures. Where estimation techniques are used, management should therefore be able to demonstrate clearly how settlement exposure is measured, and that the estimation techniques will not lead to a significant underestimation of exposure given the institution's pattern of trading. 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.

Setting and using limits

14. Banks should ensure that settlement exposures to counterparties are subject to prudent limits. FX settlement exposures should be subject to an adequate credit control

[4] Overestimation also has its 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.

[5] If a bank can reconcile its final and failed receipts in the bought currency within 24 hours of the unilateral payment cancellation deadline for the sold currency, a one-day estimate of exposure may be appropriate for that currency pair. However, this measure may not be accurate for all trades, including those in the same currencies that are in the opposite direction. For example, the duration of exposure for buying JPY and selling USD may be very short. The duration of exposure for selling JPY and buying USD is likely to be significantly longer. In addition, the bank should take account of the fact that the duration of the exposure, although less than 24 hours, may nevertheless overlap more than one calendar day (for example, it may start during the evening of the day before settlement and run until late afternoon of the settlement day).

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.

15. The limits applied by the bank to its FX settlement exposures should be binding – i.e. any excesses, such as those resulting from operational problems, should be subject to approval by the appropriate credit management personnel in advance of the excess or, if an unauthorised excess takes place, shortly thereafter. Banks should not rely on obtaining credit approval after limits are exceeded; credit officers should be available to rapidly review excesses and be able to deal adequately with the credit risks involved in the trade and the particular counterparty.

16. Effective monitoring of counterparty exposures is crucial to the management of FX settlement risk, and banks with large exposures should have systems that enable them to monitor payment flows in real-time (or close to real-time) in order to ensure that these exposures do not exceed settlement limits.

Procedures for identifying fails

17. Funds may sometimes fail to arrive promptly for a variety of reasons, including operational errors. While such mistakes may be inadvertent and corrected within a reasonable time, banks should have procedures for quickly identifying fails, informing the credit department, obtaining the funds due, and taking steps to avoid recurrences. 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 exposure (as noted in paragraphs 11 and 12 above). They should also review any series of counterparty fails to determine whether the pattern suggests that the problem is operational or whether it reflects an underlying credit-worthiness problem.

Managing FX settlement exposures

18. Banks should actively manage their exposures. The duration of exposures can be reduced by improving unilateral payment cancellation deadlines by, for example, negotiating better terms 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 deadlines with their correspondents. Further, to reduce the liquidity risks to payment systems associated with FX-related payments being concentrated at certain times during the day, deadlines should occur before the opening of the relevant domestic payment systems on settlement day.

19. Better management of exposures can also be achieved by bringing forward the receipt identification time, 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.

20. Appropriately managed collateral arrangements and 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.

Use of netting

21. Banks can reduce the size of their counterparty exposures by entering into legally binding agreements for the netting of settlement payments.[6] Legally binding 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. Depending on trading patterns, netting can significantly reduce the value of currencies settled. Netting also reduces the number of payments to one per currency either to or from each counterparty. 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 netting opportunities.

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

23. 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. Additionally, the practice and associated risks should be described in the bank's policy and procedures.

Managing residual risks in netting and other arrangements

24. As described above, use of appropriately designed netting arrangements can reduce FX settlement risk. In the future, additional options may also be available to reduce FX settlement risk.[7] While netting and other arrangements can significantly reduce FX settlement

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[6] 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.

[7] Major current proposals include 1) a private sector multicurrency settlement facility and 2) settling only the marked-to-market gain or loss from an FX trade rather than the full principal amounts.

risk, they are not always 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 on a gross basis, a bank might not have the liquidity to settle those transactions on a timely basis. Institutions should assess these risks and ensure that they are managed effectively.

Contingency planning

25. 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 defaults 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 appropriate. The plan should be tested periodically.

Internal audit

26. 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 should ensure that the scope of the FX settlement internal audit program is appropriate to the risks associated with the market environment in which the bank operates. The audit frequency should be adequate for the relevant risks associated with the FX settlement area. Most institutions base audit frequency on a risk assessment basis, and examiners should consult with the internal audit examiner to determine the adequacy of the risk assessment methodology used by the institution.

27. Audit reports should be distributed to the board of directors, or its audit committee, and to appropriate levels of management. The relevant business lines should take appropriate corrective action to address findings identified by the internal audit department and senior management should ensure that these corrective actions are taken on a timely basis. Audit reports should make recommendations for minimising FX settlement risk in cases where weaknesses are cited. Management should provide written responses to internal audit reports, indicating its intended action to correct deficiencies where noted.

28. 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.

The role of supervisors

29. 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.

30. 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. 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.

31. 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 reductions in the deadlines for irrevocable payments before payment date and in the time required to reconcile settlements.

32. 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 4) provide very helpful background to supervisors. In conducting on-site reviews, supervisors may also find the attached questions helpful.

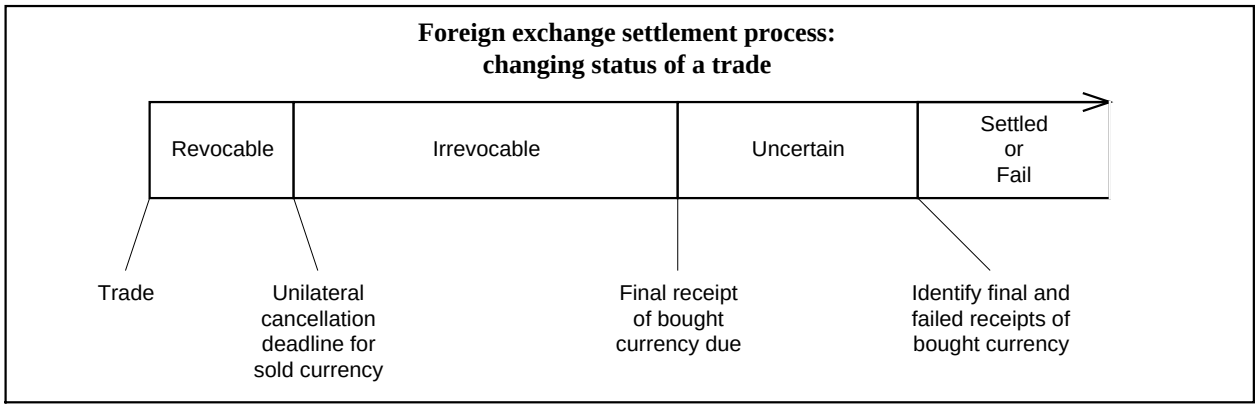
33. The most effective way to supervise FX settlement risk is to evaluate a bank's risk management process, while, over time, expecting substantial further improvements in risk management techniques. Such improvements can be monitored using the benchmarks established in the two CPSS studies. If after 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.

34. 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:

Status	**Description**
Revocable:	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.
Irrevocable:	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 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

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

A great deal has been written about the nature and complexity of settlement risks. Readers are directed to the following publications for important in-depth information about this topic. The references have been organised by general topic headings.

Funds Settlement

Reducing Foreign Exchange Settlement Risk: A Progress Report, 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 G-10 central banks toward foreign exchange settlement risk reduction.

Settlement Risk in Foreign Exchange Transactions, BIS, March 1996.

- Analyses existing arrangement for settling foreign exchange trades.
- Makes risk reducing recommendations.
- Identifies avenues for cooperation 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, 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.

Report of the Committee on Interbank Netting Schemes of the Central Banks of the Group of Ten Countries (Lamfalussy Report), 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 cooperative 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, BIS, March 1997.

- Describes and analyses clearing arrangements for exchange traded derivatives in the G-10 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, 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, 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

***B*ank 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 that identifies and analyses issues of mutual interest related to risk in payments and settlement systems.