COMMITTEE ON PAYMENT AND SETTLEMENT SYSTEMS

Consultative Report

CORE PRINCIPLES FOR SYSTEMICALLY IMPORTANT PAYMENT SYSTEMS

Part 2 - Implementing the Core Principles

Report of the Task Force on
Payment System Principles and Practices

BANK FOR INTERNATIONAL SETTLEMENTS
Basel, Switzerland

Foreword to Part 2

This second part of the report of the Task Force on Payment System Principles and Practices complements the first by giving guidance on its interpretation and examples of how the issues involved in complying with the Core Principles have been tackled in particular contexts.

The work of the Task Force was to identify and express international consensus in this area, in order for the agreed Core Principles to have universal application. The Task Force has tried, therefore, not to be prescriptive in terms of the designs or technologies to be used to achieve safety and efficiency in systemically important payment systems. Even in similar countries where broadly similar solutions have been adopted, their detailed implementation can vary in important respects. The Task Force has sought instead to concentrate on the questions it is useful to address when considering the features of any specific systemically important payment system.

The report is being released for public comment and the Task Force will take into account the comments received before finalising the report. The full report will be released by the end of this year. We hope this part of the report will be useful to payment system practitioners, whether they are designers, operators or overseers, and we look forward to comments from readers.

Interested readers may send their comments on this part of the report to the CPSS Secretariat at the Bank for International Settlements (BIS) at: Committee on Payment and Settlement Systems, Bank for International Settlements, CH 4002 Basel, Switzerland; Fax: + 41 61 280 9100; e-mail: cpss@bis.org. The consultation process will last until 8 September 2000.

I should like to express my personal thanks to the members of the Task Force, who have shown extraordinary commitment to the task and whose expertise has made the exercise possible, and to the CPSS Secretariat for their unfailing support.

Tommaso Padoa-Schioppa, Chairman
Committee on Payment and Settlement Systems

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Section 5: Introduction

5.1 The first part of this report identified safety and efficiency in systemically important payment systems as fundamental objectives of public policy. It set out ten Core Principles for the design and operation of such systems and described the leading role of central banks in pursuing the objectives, identifying four specific central bank responsibilities. The second part of the report provides guidance on how to interpret and use the Core Principles in practice. It offers more detailed explanation of the Core Principles and responsibilities, drawing on examples of how they have been or could be implemented effectively.

5.2 This second part of the report begins with a section on the scope of application of the Core Principles. It discusses how to identify systemically important payment systems and gives some general guidance on how to assess them against the Core Principles. The report then discusses the interpretation and implementation of each of the Core Principles and central bank responsibilities in a variety of different economic and institutional circumstances.

5.3 The report supplements this discussion by considering, in section 9, two special situations in which the Core Principles might be applied. The first of these situations (section 9.1) involves systems that handle paper-based debit instruments (eg cheques). Such systems are very common in many parts of the world and raise specific difficulties in satisfying some of the Core Principles. The report suggests ways in which these systems can be made safer and discusses the role they might play within national payment infrastructure as a whole. The second situation (section 9.2) involves payment systems with cross-border aspects.

5.4 The final section discusses some general issues that arise in using the Core Principles, including, in particular, the possible ways of conducting major programmes of reform or development of a country's systemically important payment systems.

Section 6: Scope of application of the Core Principles

6.1 Payment systems are at the heart of the financial sector. With rapid change nationally and internationally in technology and competition in this sector, public policy needs to focus more systematically on encouraging safe and efficient payment systems at a national and international level.

6.2 The Core Principles are intended to be applied in all countries, within a realistic time scale, whether economies are developed, in transition or emerging. The particular way in which the Core Principles are used varies with the stage of economic development and with the economy's framework of institutions and infrastructure. They should be useful, however, both in making an initial assessment of payment systems, in continued monitoring of their safety and efficiency, and in designing reform projects. The report is addressed particularly to central banks and any other public agencies charged with responsibilities in this area, as well as to the private sector designers and operators of systemically important payment systems. The report, particularly in its discussions of efficiency, is written on the basis that payment services operate in a market environment. This does not mean that the Core Principles themselves are less relevant where this is not the case, but there may be fewer directly applicable examples in Part 2 of this report.

6.3 Effective application of the Core Principles is essential if countries are to achieve the public policy objectives. Over the past ten to twenty years it has become increasingly clear that central banks have an essential role in overseeing and often in operating payment systems. This report recommends that central banks define explicitly their own roles in this context and ensure that the Core Principles are applied to all systemically important payment systems in their countries.

What constitutes a payment system?

6.4 The designs of payment systems differ widely around the world. As described in previous BIS publications, the defining elements of a payment system are "a set of instruments, banking procedures and, typically, interbank funds transfer systems that ensure the circulation of money". The focus of this report is on the funds transfer system at the core of such a system. This typically involves an agreement among a defined group of participants in the system and the system's operator, specifying rules and procedures related to the transfer of funds among the participants. Participants can be direct or indirect (as discussed in Box 11 on tiered settlement arrangements). The report recognises the wider purpose that payment systems serve in an economy, but its specific focus means that it is not directly concerned with the rights and obligations of parties other than system operators, system participants and central banks. For example, in discussing the legal concept of finality of settlement (in Core Principle IV and elsewhere), the direct concern of this report is settlement among system participants.

Identifying systemically important payment systems

6.5 A key step in implementing the Core Principles is to distinguish payment systems which are systemically important from those which are not. There may be many payment systems in a country which are important to their users and to the smooth and effective functioning of the economy. The distinguishing feature of a systemically important payment system, however, is that it is capable of triggering disruptions or transmitting shocks across the financial system domestically or even internationally. Most countries have at least one such system.

6.6 The main factor in assessing the potential for a payment system to trigger or transmit systemic disruptions is the value of the payments that the system processes, either in aggregate or individually, relative to the resources of the system's participants and in the context of the financial system more generally.

6.7 A further relevant factor in determining whether or not the system is systemically important is the nature of the payments it handles. A system that is used to settle other payment systems (for example, if it handles the payments of netted amounts to settle a multilateral net settlement system) or

a system handling payments made in settlement of financial market transactions (for example, transactions in the money markets or foreign exchange markets or the cash leg of securities market transactions) is typically considered to be a systemically important payment system.

6.8 It is likely that a system is of systemic importance if at least one of the following is true:

- it is the only payment system in a country, or the principal system in terms of the aggregate value of payments;
- it handles mainly payments of high individual value;
- it is used for the settlement of financial market transactions or for the settlement of other payment systems.

6.9 It is frequently the case that a bank provides payment services to other banks or other payment intermediaries by effecting payments between the accounts of these entities in its books. With increasing consolidation in the financial sector, such payment service arrangements could become increasingly important. These are typically bilateral arrangements between the bank and the relevant account-holder and would not normally be subject to the Core Principles. In certain borderline cases, however, the arrangements could possess some characteristics of a payment system (see section 6.4 for a discussion of what constitutes a payment system). In these cases, a decision has to be made on whether such arrangements are systemically important, and consequently whether the Core Principles should be applied. As discussed in Responsibility D, cooperation between bank supervisors and payment system overseers is needed to identify and analyse these cases. Where it is decided that the Core Principles are to be applied, a cooperative approach is often necessary at the stage of initial assessment, in relation to any changes necessary to ensure compliance, and on a continuing basis thereafter. In cases where it is decided not to apply the Core Principles, they may nevertheless be of some help in evaluating risk and efficiency aspects of such payment service arrangements and there could be a role for the payment system overseer to assist the bank supervisor.

6.10 Where a payment system is not systemically important, it can still be appropriate to apply many or all of the Core Principles. This is particularly likely if the system is widely used and users have no ready substitute methods of making the same payments.

Payment system aspects of securities settlement systems

6.11 Securities settlement systems very often provide mechanisms to transfer payments between participants either by a connection to a separate payment system or by providing payment facilities within the securities settlement system. In some cases they provide clearing services for funds which are very similar to netting arrangements and may involve very similar risks to those of a deferred net settlement payment system. The amounts involved are often large and such systems may well be systemically important.

6.12 Most, if not all, of these Core Principles will be relevant to payment mechanisms associated with securities settlement systems. There will also be additional and distinct issues connected with the transfer of securities. Central banks, as overseers of payment systems, have a clear interest in the safety and efficiency of the payment aspects in particular, while, in some cases, securities commissions have a leading responsibility for the supervision of the systems as a whole. Accordingly these public authorities need to cooperate to ensure that the securities transfer and associated payment mechanisms satisfy the public policy objectives of safety and efficiency.[1]

[1] A Task Force jointly set up by the CPSS and IOSCO in December 1999, is producing a set of recommendations for securities settlement systems.

Section 7: Interpretation and implementation of the Core Principles

Core Principle I – The system should have a well-founded legal basis under all relevant jurisdictions.

Background

7.1.1 The legal basis for a payment system is critical to its overall soundness. The legal basis typically consists of framework legislation as well as specific laws, regulations, and agreements governing both payments and the operation of the system. Examples of framework legislation include laws governing contracts, insolvency, banking, and secured interests. In some cases, competition and consumer protection laws may also be relevant. Specific laws governing the central bank, payments including electronic payments, settlement finality, netting, and related topics are especially relevant. In addition, laws from countries other than the host country, may be relevant to the robustness of the system.

7.1.2 A sound legal basis for a payment system defines, or provides the framework for relevant parties to define, the rights and obligations of operators, participants and regulators. Since most risk management mechanisms are based on assumptions about the rights and obligations of parties to payment transactions, sound and efficient risk management requires rights and obligations relating to payment system operations and risk management to be established with a high degree of confidence, and risk management mechanisms need to be based on firmly established rights and obligations so that they will function predictably when called upon during times of financial stress. The analysis of risk management mechanisms almost always leads back to questions about the soundness of legal assumptions.

7.1.3 Although sound legal underpinnings are very important, absolute legal certainty is seldom achievable. Recognition of this fact, however, should not deter payment system operators, participants, and authorities from seeking to establish a sound legal basis for payment systems. These relevant parties should identify the areas where there is a degree of legal uncertainty. One useful tool for evaluating the degree of legal certainty associated with particular legal provisions is to obtain legal opinions.

Important elements of the legal basis

7.1.4 Contract law can have a material effect on the enforceability of agreements used to establish the rights and obligations of system operators, participants, and customers of banks that participate in a payment system. Agreements must be enforceable in order to make operations, risk management, and other aspects of the system work as planned under both normal circumstances and those of financial stress. There can be obstacles to enforceability if there are incompatibilities between the particular contractual arrangements and various legislative provisions, for example provisions of insolvency or competition law.

7.1.5 It is particularly important to establish when the system achieves final settlement in order to define when key financial risks are transferred in a payment system and to provide an important building block for risk management systems. Insolvency law is highly relevant. System designers and relevant authorities must ask themselves what would happen if a participant in the system were to become insolvent. Would transactions be honoured as final, or could they be considered void or voidable by liquidators and relevant authorities? In some countries, for example, so-called “zero hour rules” (see Box 1 for a discussion of these rules) can have the effect of reversing a payment that appears to have been settled in a payment system (even in a real-time gross settlement system). Furthermore, insolvency law in some jurisdictions does not yet recognise the netted value of payments or related obligations as binding on the liquidator in the event of insolvency and, for example, payments included in the system’s calculation of multilateral net positions can be unwound. In such cases, it is not safe to rely on netted amounts for credit or liquidity risk management purposes. The legal underpinning of settlement can be strengthened greatly by eliminating “zero hour rules” and

assuring the enforceability of netting contracts and, in recent years a number of countries have undertaken programmes of relevant change to insolvency law.

Box 1

"Zero hour rule"

When applied in the context of a payment system, "zero hour rules" make all transactions by the bankrupt participant null from the start ("zero hour") of the day of the bankruptcy (or similar event). In a real-time gross settlement system, the effect could be to reverse payments that have apparently already been settled and were thought to be final. In a system with deferred net settlement, such a rule could cause the netting of all transactions to be unwound. This would entail a recalculation of all net positions and could cause significant changes to participants' balances, with possible systemic consequences.

7.1.6 Laws governing collateral transactions, whereby, for example, collateral can be provided and accepted for borrowing or lending are summarised in Box 2. These laws may be highly relevant to the design of risk management mechanisms for payment systems. For example, many central banks provide credit to participants in a payment system subject to some type of collateralisation agreement. Many privately operated netting systems adopt collateralisation mechanisms to secure lending facilities and help ensure settlement in the event of initial failures to settle. In any event, laws governing the collateral arrangements must be scrutinised carefully to ensure that a security agreement will be enforceable in a timely manner as envisaged, including when there is an insolvency. The relevant law may be different according to the type of collateral and the jurisdiction in which the collateral is located, so it will be necessary to understand the effect of such laws in the context of a specific system.

Box 2

Laws governing collateral arrangements

A collateral transaction is typically subject to three main bodies of law: the law of secured interests, insolvency law and contract law. The law of secured interests governs the establishment and realisation of collateral. For example, this is the law that determines the conditions under which a pledge (or possibly also a repo transaction) will be valid and also the procedures that have to be followed if the transferor defaults and the collateral has to be realised by the transferee. The most likely reason for a default by the transferor is insolvency, and thus the realisation of the collateral can be directly affected by the relevant insolvency law. (Moreover, some countries may have different types of insolvency schemes depending, for example, on the type of entity that is insolvent.) Contract law is also likely to be relevant to the terms of the agreement between the transferee and transferor governing the collateral transaction. In addition to these, other bodies of law can sometimes be relevant, for example, banking law, securities law, consumer protection law and criminal law.

7.1.7 The legal structure should not inhibit the development of new payment system technology. Where electronic processing is involved, whether the underlying instruments the system handles are electronic or paper-based, it may be necessary to ensure that the relevant law is compatible with the methods used. New legislation might be needed to achieve clarity and predictability of interpretation in matters such as finality of settlement, valid authorisation, and the allocation of rights and obligations in cases of error or fraud.

7.1.8 Banking and central banking laws can also play an important role. Banks and central banks may need authority in law to establish and participate in payment systems and to design effective and well managed systems, including adopting sound risk management principles. It should not simply be assumed that these areas of the law are adequate, particularly when countries are undertaking a reform or development programme for systemically important payment systems for the first time. This can be a useful opportunity to undertake a review (see section 10.8-10.14 for a discussion of payment system reform and development programmes).

7.1.9 Laws from jurisdictions other than the jurisdiction in which the system is located can be relevant, for example where a system provides a cross-border service or where foreign institutions participate in a domestic payment system. The laws of such participants' home jurisdictions are likely to be relevant, as well as the laws of the jurisdiction under which the system operates. See section 9.2 for a general discussion of issues particular to systems with cross-border aspects. Many laws are potentially relevant, but of particular importance will be insolvency laws in the different jurisdictions. For example, it can be relevant to consider whether, in the event of a participant's insolvency, a liquidator might be able successfully to challenge the netted value of payments in a payment system involving net settlement. If sufficiently material legal risks would stem from participation by institutions from a particular jurisdiction, it might be necessary to develop mitigating risk controls. If such controls are not sufficient, access to the system may ultimately need to be limited. Core Principle IX provides guidance on balancing fair and open access with limiting risk through access restrictions. There have been a number of regional and international initiatives to reduce the risks of legal uncertainties or conflict. These include the United Nations UNCITRAL initiative to provide a more harmonised approach to such issues, various European Union directives, such as the Settlement Finality Directive (see Box 3) and Article 4A of the US Uniform Commercial Code (see Box 4).

Core Principle I – Implementation summary

7.1.10 A sound legal basis is fundamental to risk management. Careful attention should be given to the:

- completeness and reliability of framework legislation;
- enforceability of laws and of contracts in all relevant circumstances;
- clarity of timing of final settlement especially when there is an insolvency;
- legal recognition of netting arrangements;
- existence of any zero hour or similar rules;
- enforceability of security interests provided under collateral arrangements and of any relevant repo agreements;
- a legal framework that would support electronic processing of payments;
- relevant provisions of banking and central banking law;
- relevance of laws outside the domestic jurisdiction.

Box 3

EU directive on settlement finality in payment and securities settlement systems

The purpose of the EU Settlement Finality Directive is to reduce systemic risk by removing various areas of uncertainty in payment and securities settlement systems. The Directive provides that:

- Netting is to be protected from potentially disruptive insolvency law - so, even if a system participant fails during the day, a liquidator cannot generally unwind settlement occurring net at end-of-day.
- Transfer orders are to be protected from insolvency law provisions from the moment they enter a designated system - ensuring that processing, once begun, is able to complete, even if the inputting institution fails in the meantime.
- The retroactive effects of insolvency rules on rights and obligations in systems are to be prohibited - to eliminate rules backdating the effects of an insolvency, for example to just after midnight ('zero-hour' – see Box 1) or to some other specified time.
- The law governing a system will generally determine the effect of insolvency proceedings on participants' rights and obligations - to resolve conflict between the system rules and the home country insolvency law of a foreign participant.
- Collateral security will be insulated from the effect of insolvency proceedings - ensuring that it can be used to clear the debts to a system of a failed participant.

The following are relevant extracts from the Directive's provisions:

Article 3

1. Transfer orders and netting shall be legally enforceable and, even in the event of insolvency proceedings against a participant, shall be binding on third parties, provided that transfer orders were entered into a system before the moment of opening of such insolvency proceeding.
2. No law, regulation, rule or practice on the setting aside of contracts and transactions concluded before the moment of opening of insolvency proceedings shall lead to the unwinding of a netting.
3. The moment of entry of a transfer order into a system shall be defined by the rules of that system. If there are conditions laid down in the national law governing the system as to the moment of entry, the rules of that system must be in accordance with such conditions.

Article 5

A transfer order may not be revoked by a participant in a system, nor by a third party, from the moment defined by the rules of that system.

Article 7

Insolvency proceedings shall not have retroactive effects on the rights and obligations of a participant arising from, or in connection with, its participation in a system earlier than the moment of opening of such proceedings.

Article 8

In the event of insolvency proceedings being opened against a participant in a system, the rights and obligations arising from, or in connection with, the participation of that participant shall be determined by the law governing that system.

Article 9.1

The rights of:

– a participant to collateral security provided to it in connection with a system, and

– central banks of the Member States or the future European central bank to collateral security provided to them,

shall not be affected by insolvency proceedings against the participant or counterparty to central banks of the Member States or the future European central bank which provided the collateral security. Such collateral security may be realised for the satisfaction of these rights.

Directive 98/26/EC of the European Parliament and of the Council of 19 May 1998 on settlement finality in payment and securities settlement systems – *Official Journal L 166. 11/06/1998 p. 0045 – 0050*

Box 4

Uniform Commercial Code 4 A in the US

The states are the primary source of law on commercial transactions in the US. Some of that commercial law is based on the Uniform Commercial Code (U.C.C), which is developed on a uniform basis but implemented by legislation in individual states. In the area of payment systems, all 50 states have adopted Article 4A of the U.C.C., which governs the specialised method of payment referred to in the Article as a *funds transfer*. The scope of Article 4A is determined by the definitions of "payment order" and "funds transfer" found in Section 4A-103 and Section 4A-104.

Section 4A-403 determines when a payment by a sender (bank) to a receiving bank is deemed to have occurred. This section also allows a funds transfer system to establish a rule which provides that a sender's obligation to pay is satisfied to the extent that obligations are netted by the funds transfer system.

The following are the relevant extracts from Section 4A-403 of the U.C.C:

§ 4 A-403. Payment by sender to receiving bank.

(a) Payment of the sender's obligation under Section 4A-402 to pay the receiving bank occurs as follows:

(1) If the sender is a bank, payment occurs when the receiving bank receives final settlement of the obligation through a Federal Reserve Bank or through a funds-transfer system.

(2) If the sender is a bank and the sender (i) credited an account of the receiving bank with the sender, or (ii) caused an account of the receiving bank in another bank to be credited, payment occurs when the credit is withdrawn or, if not withdrawn, at midnight of the day on which the credit is withdrawable and the receiving bank learns of that fact.

(3) If the receiving bank debits an account of the sender with the receiving bank, payment occurs when the debit is made to the extent the debit is covered by a withdrawable credit balance in the account.

(b) If the sender and receiving bank are members of a funds-transfer system that nets obligations multilaterally among participants, the receiving bank receives final settlement when settlement is complete in accordance with the rules of the system. The obligation of the sender to pay the amount of a payment order transmitted through the funds-transfer system may be satisfied, to the extent permitted by the rules of the system, by setting off and applying against the sender's obligation the right of the sender to receive payment from the receiving bank of the amount of any other payment order transmitted to the sender by the receiving bank through the funds-transfer system. The aggregate balance of obligations owed by each sender to each receiving bank in the funds-transfer system may be satisfied, to the extent permitted by the rules of the system, by setting off and applying against that balance the aggregate balance of obligations owed to the sender by other members of the system. The aggregate balance is determined after the right of setoff stated in the second sentence of this subsection has been exercised.

Core Principle II - The system's rules and procedures should enable participants to have a clear understanding of the system's impact on each of the financial risks they incur through participation in it.

7.2.1 Core Principles II and III are very closely related. The first stage in managing financial risk effectively in a payment system is to ensure that credit risks and liquidity risks are identified and well understood by all involved parties, including participants, the system operator and the settlement institution.

7.2.2 The rules and procedures of a systemically important payment system play a key role in enabling participants to understand the financial risks they incur. They therefore need to be clear and comprehensive and to contain explanatory material written in plain language that will facilitate understanding by all parties of the risks they may face through participation in the system. The parties will first need to understand the basic design of the system, as that will be an important determinant of their rights and obligations. The rules, procedures and explanatory material also need to be up-to-date and accurate, so there need to be arrangements to ensure that agreed changes are incorporated quickly. Rules and procedures should be readily available to all interested parties and at least the key rules relating to financial risks should be made publicly available. Active consideration should be given to publicising all rules. Publication facilitates understanding by third-party users of the payment system.

7.2.3 There is also an important link with Core Principle I, because a sound legal framework is necessary to establish with a high degree of confidence the rights and obligations of the various parties and the robustness of these rights and obligations, especially in times of financial stress. Background information or supporting documentation about the degree of legal certainty associated with rules and procedures and the enforceability of rules in various situations should be provided to all involved parties. This information might include, where relevant, legal opinions, together with analysis of the risks. The system operator normally bears the primary responsibility for the provision of this information since the operator is usually in the best position to provide the resources and to obtain the information necessary to conduct analytical work.

7.2.4 The rules and procedures should outline clearly the roles of participants and the system operator and the procedures that will be followed in various circumstances (for example, which parties are to be notified of specific events and the timetables for decision-making and notification). They should make clear the degree of discretion parties are able to exercise in taking decisions which can have a direct effect on the operation of the system. The degree of discretion the operator can exercise to make unilateral changes to the rules or procedures and any period of notice it must give to participants should be clear. Where the operator has to consult participants on proposed changes, the process for consultation and agreement on such changes must also be clear. If the central bank has discretion in providing intraday or overnight credit, involved parties should be aware of this fact and its implications. In some specific cases, confidentiality constraints can limit the dissemination of information to involved parties (for example, in situations that require consultation with supervisory or government authorities).

7.2.5 It is useful to include in the information provided to the parties a clear description of the typical life cycle of a payment message in normal circumstances (see Box 5 for a stylised diagram of the life cycle of a payment transaction). This information would highlight how the system processes the message, the validation and checks to which the message is subjected, how settlement occurs, the timetables for these events and the responsibilities of the various parties for the successful processing of a payments message. The information should also indicate the actions that would be taken and by whom in various abnormal situations.

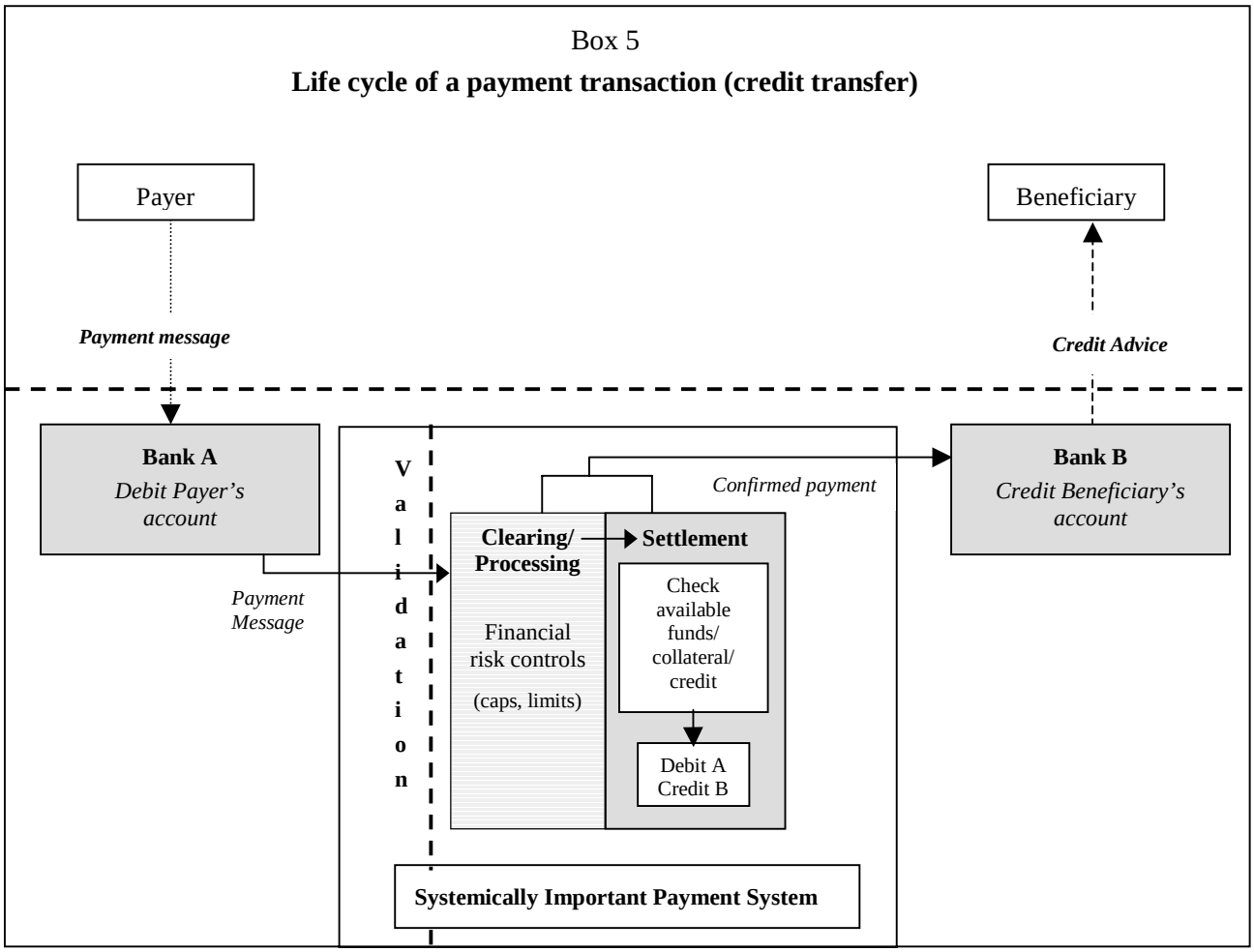
7.2.6 While the primary responsibility for producing clear, timely and readily understandable rules and procedures rests with the operator, the primary responsibility for reading and understanding the materials rests with the participants. Nevertheless, the operator can help participants by providing appropriate training, particularly for new participants and for new staff of existing participants. This process could be combined with technical training about operational methods.

7.2.7 The operator can also be well placed to observe the performance of participants and to identify those who do not demonstrate a thorough understanding of the procedures and who could

therefore be creating unnecessary risks. In such cases it would be useful for the operator to advise the participant concerned at an appropriate level within the institution or, in important cases, to advise the system's overseer or the participant's supervisor.

Box 5

Life cycle of a payment transaction (credit transfer)



Core Principle II – Implementation summary

7.2.8 Participants need to understand the financial risks they bear. Operators should therefore have rules and procedures that:

- are clear, comprehensive and up-to-date;
- explain the system design, its timetable and risk management procedures;
- explain the system's legal basis and roles of the parties;
- are readily available;
- explain where there is discretion and how it is exercised;
- set out decision and notification procedures and timetables for handling abnormal situations.

It may also be useful to organise participant training and monitor the performance of participants as evidence of their understanding.

Core Principle III - The system should have clearly defined procedures for the management of credit risks and liquidity risks, which specify the respective responsibilities of the system operator and the participants and which provide appropriate incentives to manage and contain those risks.

7.3.1 Core Principle III is very closely related to Core Principle II. Core Principle II addresses the transparency and availability of the system's rules and procedures, emphasising that it is important for them to be clear and understandable. The concern of Core Principle III is the quality of the system's rules and procedures, emphasising the importance of appropriate management of financial (credit and liquidity) risks.

7.3.2 Financial risks are one of the most important areas of risk in payment systems and the key means of controlling them is through the system's rules and procedures. The rules and procedures should cover both normal situations and abnormal events, such as the inability of a participant to meet its obligations. The way in which they incorporate financial risk management and allocate relevant responsibilities to the operator and to participants differs according to the design of the system. The salient features of the main types of system design - real-time gross settlement, deferred net settlement, or hybrid - are outlined in Boxes 7 and 8, with particular reference to those features relevant to the control of financial risks. In this section the means of controlling credit risk and the means of controlling liquidity risk are considered in turn, followed by discussion of the ways in which a system's rules and procedures can provide incentives for its participants to control these risks effectively.

7.3.3 There is also a relationship between Core Principle III and criteria for participant access, which are the subject of Core Principle IX, because participants with different characteristics, for example different degrees of creditworthiness, can bring different degrees of financial risk to the system and to the other participants. These issues are more fully discussed under Core Principle IX.

Credit risks

7.3.4 Credit exposures between participants arise in systems in which there is a delay between a payment's acceptance by the system for settlement and its final settlement. Such exposures, therefore, do not arise in well designed real-time gross settlement systems, where there is no such delay– (see Core Principle IV for a discussion of prompt final settlement of payments on the day of value.) Even when a payment is made through a real-time gross settlement system, it may be possible for a receiving participant to credit its customer in anticipation of a receipt. Such possibilities should be reviewed when considering the design of systems. However, if the design of the system does not compel the receiving participant to do this, the financial risks involved generally fall outside the scope of the Core Principles.[2]

7.3.5 Systems which involve a delay between acceptance for settlement and final settlement (see Box 9), for example deferred net settlement systems, give rise to credit exposures between participants, which need to be monitored and controlled. Limits should be placed on the maximum level of credit risk that can be created by any participant. Such limits can be applied by the system operator, normally on the basis of the multilateral (net) exposure of all other participants to the relevant participant, or they can be applied by individual participants towards each other participant, on the basis of their bilateral net exposures. The two types of limit frequently complement each other within the same system. Factors such as the creditworthiness of participants, liquidity availability and operational considerations usually influence the levels at which these limits are set.

7.3.6 When a system settles on a deferred net basis and credit exposures limits are related to a participant's net exposure, it is important that the netting should be legally robust (Core Principle I addresses the legal basis of payment systems). If it is possible for payments that have already been

[2] These issues are discussed in the report *"Real-time gross settlement systems"*, BIS, March 1997. Copies can be obtained from the CPSS Secretariat, Bank for International Settlements or from the BIS website (http://www.bis.org).

made to be unwound in the event of a participant failure, credit (and liquidity) risk could be exacerbated, since a recalculation of settlement obligations could result in exposures above the levels of the relevant limits, leaving surviving participants with inadequate funds to meet their own obligations within or outside the payment system. Such a system would not comply with Core Principle III (see Box 6 for a discussion on the unwinding of transactions.)

7.3.7 Limits need to be accompanied by allocations of responsibility to cover losses that could result within the system from participant failure. These allocations frequently comprise or include "survivors-pay" arrangements for the sharing of losses. Loss-sharing arrangements based on this principle would, in the event of a participant's inability to settle, require the losses to be borne by the surviving participants according to some predetermined formula. Such arrangements pose different credit and liquidity risks to participants from systems which rely exclusively on "defaulter-pays" arrangements, where each participant is required to collateralise any exposures that it creates for other participants. Paragraphs 7.5.3-7.5.5 deal with issues related to the establishment and management of pools of collateral and paragraph 7.5.7 discusses the relationship between the type of arrangement necessary to comply with Core Principle V and "survivors pay" loss-sharing arrangements to manage credit risk in compliance with Core Principle III.

Box 6

Unwinding transactions as a means of allocating losses

In some payment systems with deferred net settlement (see Box 7 for a discussion of these settlement systems), if a participant is unable to settle, the means for addressing the funding shortfall would be to remove some or all of the payments involving the failed participant from the calculation of the its multilateral net position, even though the payments had been accepted for settlement. For example, those transactions by the failed participant that the system had accepted most recently might be removed, so as to cover as much as possible of the multilateral net debit position that the failed participant was unable to meet. This is sometimes referred to as "unwinding" transactions. (Box 9 contains a diagram which illustrates the changing status of payments within payment systems, including the significance of "acceptance for settlement".)

For a systemically important payment system, this is not normally an acceptable means of allocating the funding shortfall, primarily because its random impact on surviving participants means that there is no incentive for system participants to manage and contain credit risk within the system. If the changes in surviving participants' positions in such a system are not only random in their incidence but also potentially very large, for example because the system does not provide controls on the size of a participant's net debit position, then unwinding would certainly be unacceptable in a systemically important payment system.

Liquidity risks

7.3.8 Core Principle V covers the management of liquidity risk when a participant is unable to meet its settlement obligation in a deferred net settlement system. In systems which do not involve deferral of settlement, such as real-time gross settlement systems, liquidity risk arises differently. A participant making a payment through a real-time gross settlement system needs to have the necessary liquidity available on its account with the settlement institution in order for the payment to be accepted by the system for settlement. If there is insufficient liquidity in the system (or it is not sufficiently well distributed) to permit an even flow of payments in the course of an operating day, the result can be gridlock (see section 3.8.4 in Part 1 of this report for a discussion of the effect of intraday liquidity on payment system efficiency). Similar gridlock could also occur in a system with deferred net settlement, if position limits prevented large values of payments from being accepted by the system for settlement. Frequent occurrence of gridlock can lead to a loss of confidence in the payment system and perhaps the use of less safe alternative arrangements. Various possible means can be used to reduce the risk of gridlock.

7.3.9 In the first place, the design and operation of payment queues can play an important role in ensuring that available liquidity is used efficiently. For example, a queue based simply on the principle of first-in-first-out might cause large payments to create unnecessary delays to the system's throughput. On the other hand, a more sophisticated algorithm can reduce the requirement for liquidity

and so achieve similar benefits to hybrid systems (see Box 8 for a discussion of hybrid systems), as well as reducing delays in the flow of payments through the system.

Box 7

Real-time gross settlement systems and deferred net settlement systems

The distinction between real-time gross settlement (RTGS) systems and deferred (or designated-time) net settlement systems (DNS) concerns the form and timing of settlement, not the way that payment messages are processed or transmitted. (See Box 9, which contains a diagram illustrating the changing status of payments within payment systems.) DNS systems can handle payment messages in real time but they settle in batches on a net basis at designated times which could be during the operating day or, more typically, at the end of the day. RTGS systems, on the other hand, settle payments on a transaction-by-transaction basis as soon as they are accepted by the system.

At the designated time, DNS systems settle multiple payments that have already been accepted by the system for settlement. This causes the system's participants to be exposed to financial risks for the period during which settlement is deferred. If not sufficiently controlled, these risks can affect not only direct counterparties but also other participants, because one participant's inability to settle could cause the positions of other participants to change, opening up the possibility that they too might fail to meet their altered obligations.

RTGS systems, however, do not create credit risk for the receiving participant because they settle each payment individually, as soon as it is accepted by the system for settlement. For any payments not accepted, liquidity risks remain, as well as the possibility of risks being shifted outside the system.

RTGS systems can require relatively large amounts of intraday liquidity, because participants need sufficient liquidity to cover their outgoing payments. Liquidity can come from various sources, including opening balances, or reserve balances at the central bank, incoming payments and intraday credit (which is usually provided by the central bank). Adequate liquidity, relative to the value and distribution of payments, makes a smooth flow of payments possible through such systems, helping to avoid delays to individual payments and minimising liquidity risks. The cost of intraday liquidity depends on a number of variables, including the amount required, the opportunity cost of maintaining liquid balances, and the cost of intraday credit (eg collateral costs, overdraft charges).

In DNS systems, intraday liquidity is provided by participants in the system, exposing them to credit and liquidity risks. Costs arise in introducing mechanisms for controlling these financial risks, for example the costs of complying with Core Principle V by establishing a collateral pool and obtaining committed lines of credit in order to ensure the timely completion of daily settlements in adverse circumstances.

Alternative approaches involving hybrid designs are being developed to combine the prompt final settlement achieved in RTGS systems with the liquidity-efficiency of DNS systems. Hybrid systems are described in Box 8.

7.3.10 The availability of liquidity in the form of the settlement asset (usually a claim on the central bank – see Core Principle VI, which discusses settlement assets in detail) can also be addressed directly. Such liquidity can be obtained by borrowing from the central bank. The central bank will need to consider how it should control the risks it faces through the provision of such liquidity. In the first place, the provision should always be explicit. Most central banks also require risk control measures such as full collateralisation of any borrowings and/or limits on their amount. A central bank also needs to consider how it will deal with (for example, how it will price) intraday liquidity that is not repaid before the end of the system's operating day.

7.3.11 Attention needs to be paid also to the roles and responsibilities of the system operator and participants for monitoring and facilitating a smooth flow of payments through the system. These should be specified clearly in the rules and procedures. Guidelines on throughput are a commonly used tool, under which participants are encouraged or required to take actions or meet targets. For example, participants could be required to ensure that, on average, a certain proportion of their outgoing payments are processed by one or more intraday deadlines. Such guidelines need to be monitored closely, both by the participant concerned and by the system operator. Some central banks favour an

automatic synchronisation of payment flows through a mechanism of variable sender limits. All parties should also have a clear understanding of the status and treatment of payment messages that remain in any queue at the close of the system's operating day.

Box 8

Hybrid systems

Recent innovations in the design and operation of some large-value payment systems have resulted in "hybrid systems", which combine the prompt final settlement achieved in real-time gross settlement systems with the greater efficiency in liquidity usage that normally characterises systems with deferred net settlement. The legal basis and operational features of hybrid systems vary from one system to another, but their underlying characteristic is frequent netting or offsetting of payments in the course of the operating day with immediate final settlement. The "netting/offsetting" can take the legal form of netting or of the offsetting/simultaneous settlement of payments which legally remain gross (involving simultaneous settlement). A typical approach is to hold payments in a central queue and to net/offset them continuously or at frequent intervals against payments from other participants. To the extent that the resulting net debit positions are fully covered (eg by balances in the participants' settlement account or by incoming payments), they can then be settled immediately. Payments that cannot be settled, continue to be held in the queue for the next round of netting and settlement. In some cases, the procedure to deal with payment messages remaining in the queue towards the end of the day is to return them to the sender (as would also be the case in real-time gross settlement systems, if there were insufficient liquidity). Another approach is to conduct a last batch of netting and settlement at the end of the day. In systems that undertake netting and settlement at predetermined times, one such time is usually at the end of the day.

The frequent netting in hybrid systems is designed to reduce the liquidity needed relative to a real-time gross settlement system. At the same time, much of the risk associated with deferred net settlement can be avoided by two features:

– only payments that give rise to covered net positions are included in each round of netting; and

– final settlement of the net positions occurs immediately on each round of netting.

Systems differ in the degree of freedom participants have to use their settlement balances in the course of the day. In some systems, they can be used only to fund payment obligations within the system. In others, settlement balances may be withdrawn to or replenished from other accounts, for example settlement accounts in other payment systems.

Although the design features may vary, typical features include a queue (usually centralised), facilities for real-time message transmission, and complex algorithms to process payments. A variety of optimisation routines can be used to match, offset or net queued payments in batches which can be quite frequent. These routines are designed to select only those payments that can be matched, offset or netted bilaterally between pairs of participants or multilaterally by comparing payments among several participants simultaneously. Additional design features may include setting bilateral or multilateral credit limits, the option to settle some individual payments by debiting the settlement accounts directly, and providing additional liquidity against collateral.

Euro Access Frankfurt (EAF) in Germany, Paris Net Settlement System (PNS) and the proposed New CHIPS in the US are examples of such hybrid systems. These forms are still evolving and more innovations are likely in the future. In Germany, highly sophisticated optimisation routines for the dissolution of queues (RTGS plus) are being developed. Similar benefits can also be achieved in real-time gross settlement systems through sophisticated scheduling.

7.3.12 In addition to its role in supplying liquidity to system participants in the ordinary course, a central bank can also have an explicit or implicit commitment to provide liquidity to the system or its participants in abnormal situations. In conjunction with the system operator (if the central bank does not itself operate the system), and possibly with the relevant bank supervisor (see also Responsibility D), it needs to consider the range of possible situations, its possible responses, and the manner in which it will control its exposures and any moral hazard concerns that such commitments might involve.

Information and monitoring

7.3.13 Information systems and monitoring procedures need to be developed to support the application of rules and procedures related to the monitoring and control of financial risks, for example in applying limits on exposures or in monitoring balances with and borrowings from the central bank. While these procedures do not have to be automated, the emerging best practice is for risk management systems to be carried out in real-time (that is, immediately and continuously as payment flows are processed by the system throughout the system's day). Real-time risk management processes permit the provision of real-time information to participants on the payments processed, their settlement account balances or positions, as well as their positions relative to risk management limits. Where systems do not operate in real-time, they should provide clear, full, updated information to parties as frequently as possible in the course of the day.

Incentives

7.3.14 It is important for the parties to have the incentive, as well as the capacity, to manage and contain financial risk. There are several ways in which incentives can be provided through the system's rules and procedures. For example, in controlling credit risk by means of loss-sharing arrangements, the formula used in determining the shares that each participant would bear can reflect the share of credit granted to the failed participant. This provides participants with stronger incentives to limit risk appropriately than a formula that provided for the sharing of losses among survivors, for example, equally or on the basis of volumes or values of overall payments traffic. A participant's ability to limit risk in this context is facilitated if the rules and procedures provide for bilateral limits on credit exposure to be set by the participant subject to exposure. A second example is the provision of incentives by means of the pricing structure (including possibly contractual penalties), for example to reinforce throughput guidelines designed to control liquidity risk in a real-time gross settlement system or to discourage borrowers of intraday liquidity from the central bank from failing to repay by the end of the system's operating day.

Core Principle III – Implementation summary

7.3.15 The effective management of financial risks is at the heart of designing safe payment systems. The appropriate tools and incentives depend on the type of system design, but techniques include:

Tools for managing credit risks

- Using system designs in which credit risk between participants does not arise (eg in real-time gross settlement systems)
- Access criteria (but the system needs also to comply with Core Principle IX).
- Credit limits (bilateral or multilateral) to cap exposures
- Loss-sharing arrangements and/or "defaulter pays" arrangements

Tools for managing liquidity risks

- Management of payment queues
- Provision of intraday credit (which means credit risk issues for the lender, eg the central bank)
- Throughput guidelines
- Position (receiver or sender) limits
- Tools described under Core Principle V for systems with deferred net settlement

General tools

- Information systems to support the tools for managing credit and liquidity risks
- Clear, full and timely (ideally real-time) financial information to participants
- Timely monitoring by the system operator

Incentives to manage these risks can come from:

- Formula for loss-sharing – for example if it reflects the scale/nature of controllable positions with the failed institution
- Pricing

Core Principle IV - The system should provide prompt final settlement on the day of value, preferably during the day and at a minimum at the end of the day.

7.4.1 Core Principle IV is concerned with the final settlement of payments made through a systemically important payment system between its participants. Systems should be designed so that they achieve final settlement on the day of value under normal circumstances. This means that any payment that is accepted by the system for settlement should be settled finally on the day on which it is due to the receiving participant in the system. (A frequently used term for this is "same-day settlement", although more precise language has been preferred in this report, particularly as the same term is also commonly used, but with a different meaning, in the context of financial markets, for example in the foreign exchange market, to refer to trades which are agreed and settled on the same business day.) A transaction that has been submitted to the system and has passed all its risk controls and other requirements is "accepted by the system for settlement" and cannot be removed from the settlement process without violating Core Principle IV. (See Box 9, which provides a diagrammatic illustration of these terms. In particular, the use of the term "accepted for settlement" in this report differs from the way it is sometimes used in other contexts, when it can be applied to technical acceptance by the system without reference to the application of risk controls. This technical acceptance is termed "validation by the system" in Box 9.) This report assumes that, although validation can take place in some systems before the day of value, the nature of risk controls is such that acceptance for settlement would not. If it were possible for a payment to pass the risk controls so as to be accepted for settlement before the day of value, this Core Principle applies as though the payment had been accepted for settlement at the start of operations on the day of value. Systems that provide finality at the end of the day of value avoid the extension of financial risk overnight and so satisfy Core Principle IV, but a shorter interval between the system's acceptance of a payment for settlement and the final settlement of that payment may be highly desirable.

7.4.2 Systems that provide final settlement after the day of value do not normally satisfy Core Principle IV, even if the value is adjusted back to the day of value, because in most cases there is no certainty on the value date that final settlement will occur as expected. Similarly, systems which use settlement assets which are not final until after the day of value (for example, cheques transferred among settlement banks) would also fail to satisfy Core Principle IV.

7.4.3 In exceptional cases, systems may also be able to achieve the effect of Core Principle IV, even if final settlement does not actually occur on the day of value, by means of a guarantee given on that day (for example by the central bank) that settlement will occur under any circumstances - see Box 10 for a discussion of guarantees to assure final settlement.

7.4.4 Achieving final settlement by the end of the day is the minimum standard. In many countries systems exist which exceed the minimum standard, by providing, continuous or very frequent settlement in the course of the day. A real-time gross settlement system is a common way to accomplish this; hybrid systems can provide similarly prompt settlement. Deferred net settlement systems can also exceed the minimum standard by providing settlement not only at its end, but also at one or more designated times in the course of an operating day. See Boxes 7 and 8 for a discussion of RTGS and deferred net settlements, and hybrid systems, respectively.

Box 9

The changing status of a payment within a payment system

Submitted	Validated by the system	Accepted for settlement	Settled with finality
• The details of the payment have been transmitted to the payment system. This can sometimes be done before the settlement date. • The payment system conducts various operational processes on the payment, such as validation.	• Payments may be placed in a queue before being accepted for settlement. • The payment system applies its risk management controls.	• The payment has passed all risk management and other controls and the system has determined that it can be settled. • In an RTGS system, final settlement follows immediately. • In a DNS system, the payment is netted. Final settlement takes place at the designated time.	• The settlement account of the receiving participant within the payment system has been credited and settlement is unconditional and irrevocable

Time

This box summarises the changing status of a payment after the payment system has received the payment information. These categories are intended to illustrate how the general nature of the payment changes within the system and are not intended to represent specific legal terms. Core Principle IV calls both for final settlement to be completed "promptly" during the day and for the period between the acceptance of payments for settlement and their final settlement to be kept to a minimum.

7.4.5 Significant benefits stem from a country having at least one system that provides finality before the end of the day, particularly if that country has an active financial market. These benefits include supporting the settlement of transactions in financial markets (such as securities markets) and providing an infrastructure that can help to reduce foreign exchange settlement risk.

Determining when final settlement occurs

7.4.6 A clearly defined time of final settlement (ie when settlement of the payment obligation is both irrevocable and unconditional) is essential for determining compliance with Core Principle IV. The definition should apply even in abnormal circumstances. For example, some systems have rules or procedures that allow payments to be unwound if a participant fails to meet its settlement obligation. Settlement cannot be considered final until all conditions that could cause an unwind have been satisfied.

7.4.7 The system's rules and the legal framework within which they function generally determine finality. The legal regime governing payments, the payment system and insolvency law must acknowledge discharge of any obligation to transfer money between system participants for transfers to be considered final. Because of the complexity of legal regimes and system rules, a well reasoned legal opinion is generally necessary to establish when finality takes place. (For more on related legal issues, see also Core Principle I.) See Box 3 for the relevant provisions of the EU Settlement Finality Directive, which illustrate a form of law designed to secure payment system finality.

Box 10

Using a guarantee to assure final settlement

There is at least one example – the Large-Value Transfer System in Canada – of a central bank providing a guarantee of settlement, before settlement actually occurs, in a deferred net settlement system. To participants this is functionally equivalent to final settlement, because it gives them an unconditional claim on the central bank.

To be effective, such a guarantee needs to be explicit and legally valid. The central bank, as guarantor, is assuming risk and is concerned both to protect itself and to provide incentives for participants to control those risks. It could require risk controls, such as a collateral pool provided by the system's participants to ensure the timely completion of the daily settlements in the event that the participant with the largest single settlement obligation is unable to meet its obligation. It would be inadvisable for a central bank to give a guarantee of settlement unless at least the minimum standard in Core Principle V was met without reliance on the guarantee.

What constitutes "prompt" final settlement?

7.4.8 How promptly final settlement takes place, for the purposes of Core Principle IV, is determined by the length of the interval between the system's acceptance of a payment for settlement and the final settlement of that payment. (Promptness of acceptance by the system for settlement is outside the scope of this Core Principle and typically depends on other factors, such as the adequacy of liquidity or intraday credit. Sections 7.3.8 – 7.3.12 describe the importance of avoiding gridlock and give examples of how this might be achieved.) The promptness of final settlement varies with the type of payment system. In systems designed to provide settlement continuously, such as real-time gross settlement systems and some hybrid systems, there should be no perceptible delay between the acceptance of a payment for settlement and final settlement. Such systems are likely to have adequate processing capabilities to keep any delay to a matter of seconds. Other hybrid systems, based on the frequent settlement of batches of payments, also considerably exceed the minimum standard. See Boxes 7 and 8 for a discussion of RTGS and deferred net settlement systems, and hybrid systems.

7.4.9 In deferred net settlement systems, the time between the acceptance of payments and final settlement should be kept to a minimum. To reduce this time, participants should be informed of final account balances as quickly as possible, best of all in real time. Participants owing net balances should be required to fund their positions rapidly. Funds, once received, should be paid out promptly to participants with credit positions. The system's procedures should prevent it from paying out before debit positions have been funded.

7.4.10 In all systems, cut-off times should be clearly defined and strictly followed. The rules should make clear that extensions are exceptional and require individual justification; for example they may be permissible for reasons connected with the implementation of monetary policy. If extensions are allowed for participants with operating problems to complete processing, the rules governing the approval of and the allowable length of time for extensions should be clear to participants. If a system frequently needs to extend cut-off times, the operator should examine the reasons for this and work with participants to reduce the frequency. Similarly, payment systems should not need to extend deadlines frequently due to internal operating problems – see Core Principle VII, which addresses the issue of operational reliability.

Principle IV – Implementation summary

7.4.11 Promptness of final settlement on the day of value entails:

- clarity in the system rules and procedures that a payment accepted by the system for settlement cannot be removed from the settlement process;
- a clearly defined and legally effective moment of final settlement;
- ensuring that the interval between the system's acceptance of a payment and the payment's final settlement at least never lasts overnight and preferably is much shorter;
- ensuring that operating hours and the settlement processes are strictly enforced.

Core Principle V - A system in which multilateral netting takes place should, at a minimum, be capable of ensuring the timely completion of daily settlements in the event of an inability to settle by the participant with the largest single settlement obligation.

7.5.1 Core Principle V applies only to systems that settle on a multilateral net basis. In such systems, if a participant is unable to settle, the consequences for the system's other participants are potentially complex and can create unexpected credit or liquidity risks. Most such systems defer settlement, in the sense that there is a significant delay between the system's acceptance of a payment for settlement and the final settlement of that payment – see Core Principle IV which relates to daily settlement of payments under normal circumstances. Systems with this combination of multilateral netting and deferred settlement must establish risk management features that ensure, with a high degree of confidence, that daily settlement will be completed in adverse circumstances. At a minimum, such systems need to ensure timely completion of settlement in the event of an inability to settle by the participant with the single largest settlement obligation.

7.5.2 Satisfying Core Principle V typically requires more financial resources than are needed to complete settlement under normal conditions. Such additional resources can be deposits of cash by participants, for example with the settlement institution, available for direct use to complete settlement in adverse circumstances. But where such deposits would not pay interest or would pay it at a relatively low rate, system participants might prefer an arrangement involving contributions to a pool of collateral, consisting largely of interest-bearing securities. Unlike cash deposits, securities cannot themselves be used directly for settlement, but they can help to manage risk if there are also legally committed lines of credit or similar facilities from private-sector banks. Committed lines of credit without the support of such pools of collateral would not normally provide sufficient assurance, as the lending institutions might not honour such unsecured commitments, particularly in adverse circumstances.

7.5.3 In considering the acceptability of different securities for the collateral pool, relevant factors are the credit risk on the issuer and the market and liquidity risk of the securities. Thus, for example, letters of credit are not typically considered sufficiently liquid to be acceptable. The securities in the pool should be revalued frequently (at least daily). Often it may also be appropriate for the valuations to be made subject to "haircuts" to adjust the value of the fund for market risk.

7.5.4 Critical questions for establishing a pool of collateral include:

- how individual institutions' shares of collateral are determined;
- who controls the pool; and
- whether there are mechanisms to ensure that the collateral will actually be available to complete settlement as planned by the system.

The pool is usually under the control of the system operator or the relevant settlement agent. Collateral must be available sufficiently quickly to allow it to support use of the committed facilities. Thus, a system operator needs to ensure that custodial and control mechanisms are such that the collateral will be available when needed. Use is typically made of central banks, central securities depositories, or similarly reliable institutions. The use of commercial custodians is a further possibility, but there should be a careful risk assessment. As noted under Core Principle I, all collateral arrangements supporting a systemically important payment system must be legally sound.

7.5.5 Private sector banks are usually the source of the legally committed lines of overnight credit or similar facilities. Central banks do not normally provide specific committed facilities in this context although they could be a potential source of support. The structure of facilities should be such that the lenders are clearly able, in practice, to deliver the contracted-for funds within the time periods specified by payment system rules and the relevant loan commitments. The agreements for such facilities must also be legally sound.

7.5.6 There is a relationship between this type of arrangement to manage liquidity risk and arrangements made to manage credit risk in compliance with Core Principle III. For example, a loss-sharing arrangement can be put in place to allocate credit risk, while a committed credit line

(supported by a pool of suitable collateral) can be used to provide the funds immediately needed to complete settlement at the end of a banking day. The credit line can be repaid the next banking day out of funds provided by those designated to bear any losses. If the participants post collateral in proportions different from those in which losses would be borne, however, the incentives to default on loss-sharing obligations in an effort to shift losses to those posting collateral must be carefully analysed.

7.5.7 In many payment systems, participants also provide lines of credit or similar facilities. In these cases, there is a risk that the same institution will be able to honour neither its settlement obligation nor its obligations under the facility. If risk is concentrated in this way, it may be necessary to have more than one institution commit facilities to set appropriate exposure limits to individual participants. For example, a system meeting the minimum standard, whose providers of committed facilities are also system participants, must ensure that, if one such participant is unable to honour its obligations, exposure to it does not exceed the total commitments of the other providers. Another route, normally more costly, but which may be appropriate for countries where the banking sector is highly concentrated, is to consider payment system designs in which liquidity risk is managed by means of pre-collateralised positions (so-called "defaulter pre-pay" arrangements).

7.5.8 Circumstances in which a major participant in a systemically important system is unable to settle could occur when there is system-wide financial pressure and uncertainty. In this case there would be a significant risk that, on a single day, more than one institution might be unable to settle. Best international practice is, therefore, for deferred net settlement systems to ensure timely completion of daily settlements in more adverse circumstances than the minimum standard requires, for example in the event of inability to settle by the two participants with the largest individual settlement obligations. This can be achieved by means similar to those described above.

7.5.9 The foregoing paragraphs illustrate that, whilst it is possible to design payment systems with net settlement that meet the highest standards of risk control, this can be a complex and costly task. An alternative approach is to adopt payment system designs that do not involve multilateral netting or the deferral of settlement, such as real-time gross settlement systems and hybrid systems that provide final settlement continuously or extremely frequently. In considering whether to adopt or retain designs involving deferred net settlement the balance of costs and benefits in terms of both safety and efficiency should be taken into account.

Core Principle V – Implementation summary

7.5.10 A system that combines multilateral net settlement with deferral of settlement needs to be protected against liquidity risk arising from an inability to settle on the part of one or more participants.

- This can be achieved by ensuring that additional financial resources are available to meet this contingency. These usually involve a combination of the following:
  - a pool of collateral (cash or securities), appropriately valued;
  - committed lines of credit.
- The amount of such additional resources needs to be determined in relation to:
  - maximum individual settlement obligation;
  - whether the system meets or exceeds the minimum standard (ie whether the system is designed to withstand an inability to settle by the participant with the largest single settlement obligation or to withstand a more widespread inability to settle).
- Alternatively, the need to control liquidity risk in this context can be avoided by the use of an alternative system design (eg RTGS or some types of hybrid design) that does not give rise to the concerns addressed by Core Principle V.

Core Principle VI - Assets used for settlement should preferably be a claim on the central bank; where other assets are used, they should carry little or no credit risk and little or no liquidity risk.

7.6.1 The goal of Core Principle VI is to eliminate or minimise financial risk arising from the use of a particular asset to settle payments made through a systemically important payment system. Settlement assets are transferred among payment system participants to settle payment obligations. In other words, settlement assets are the assets that the participant receiving the payment ends up holding when the original payment obligation is fully extinguished. (Obligations between participants are not always settled by the transfer of a settlement asset; in some cases, an offsetting process may discharge obligations.) As holders of settlement assets, participants face both credit and liquidity risks. They face credit risk if the provider of the settlement asset could default on its obligation to them and liquidity risk if the asset ceases to be readily transferable into other liquid assets.

7.6.2 Participants in all systems face liquidity risk if another participant fails to make payments at the expected time. But even after a final payment has been made, the recipient may still face an additional form of liquidity risk if, in certain adverse circumstances, it is not possible to transfer the settlement asset into other claims, for example into claims on a central bank or other liquid assets. It is this distinctive form of liquidity risk - liquidity risk in respect of claims on the settlement institution (rather than on other participants) which is considered in Core Principle VI. The holder of the settlement asset also faces credit risk in respect of claims on the settlement institution, if that settlement institution could default. Claims on the central bank are almost always not only free of this credit risk but should also be most readily transferable into other liquid assets.

7.6.3 Where these risks exist, they can have particularly serious systemic implications, because all participants holding the settlement asset are exposed simultaneously and the nature of the settlement process can mean that payment system participants have little control over the timing or the size of their holdings of the settlement asset. These serious systemic implications make it highly desirable for there to be no risk that the provider of the settlement asset will default. In most systemically important payment systems this goal is achieved because settlement takes place across the books of a central bank and the settlement asset is a balance at that central bank. When the central bank is the issuer of the currency used by the payment system, Core Principle VI is fully satisfied as no credit risk or liquidity risk (of the type discussed under this Core Principle) arises for payment system participants from use of the settlement asset. Indeed, one of the fundamental purposes of central banks is to provide a safe and liquid settlement asset.

7.6.4 In less usual circumstances, the settlement asset can be a claim on a private, supervised institution. For example, balances on the books of a private sector bank can be transferred among payment system participants' accounts with that institution. In these cases, unlike the case of balances at the central bank of issue of the currency, participants are subject to credit and liquidity risks on the institution providing the settlement asset. In considering whether such exceptional cases comply with Core Principle VI, system operators and overseers should determine whether the financial risk is more than negligible. Some relevant factors are:

- The purpose of the arrangement. The payment system might, for example, be processing payments in a currency other than that of the country in which it operates. In such a case, the local central bank may not necessarily be best placed to provide a safe and liquid settlement asset for that currency. (See also Responsibility D for a discussion of the need for cooperative central bank oversight of such an arrangement.)
- The creditworthiness of the institution providing the settlement asset. The risk of default by this institution should be assessed regularly by the system operator and by the overseeing central bank; factors such as capital levels, access to liquidity, outside credit ratings and any other financial obligations should be examined. A very high standard of creditworthiness should be demanded. One method of minimising credit risk is to establish a supervised special-purpose institution with risk management features designed for that specific purpose.

- How readily participants can substitute other assets for the settlement asset in both normal and abnormal circumstances. In the interests of minimising the likelihood of a crisis of confidence, the settlement asset should be very readily transferable, for example through another payment system which settles that same day and in which the settlement asset is a claim on a central bank.
- System design should minimise the duration of participants' involuntary exposure, that is the length of time that settlement assets need to be held. The duration of exposure starts when the settlement asset replaces the claim on the party originating the payment and ends when the settlement asset is itself replaced. Determining the start of the exposure involves an examination of the settlement process and can require a legal assessment. The time at which participants are able to substitute other assets for the settlement asset determines when involuntary exposure ends.
- Risk controls could, in some cases, reduce credit and/or liquidity risks. Possible examples are limits on participants' positions (sender or receiver limits), collateral pools supporting committed lines of credit, third-party guarantees and procedures for allocating losses arising from a default by the settlement institution. It is unlikely that these controls could completely eliminate risk on the settlement asset without significantly limiting system liquidity, because the aggregate amount of the settlement assets held by participants can be extremely large.

7.6.5 How much credit risk and liquidity risk is acceptable must be decided on a case-by-case basis, taking into account the role of the payment system in the economy and the cost of alternative arrangements. The risks associated with the settlement asset should, however, be kept as low as practical and the safest solution is to settle in central bank account balances.

7.6.6 Particular considerations arise if a systemically important payment system uses claims on a central bank to settle payments in a currency which the central bank does not itself issue. The settlement asset in this case carries no credit risk because the settlement institution is a central bank, but it is subject to the risk that participants' holdings of the settlement asset may not be readily convertible into claims on other institutions.

7.6.7 Section 3.6.3 in Part 1 of this report referred to systems where minimal use is made of a settlement asset. Box 11 describes the way in which, in some systems, not all participants are direct holders of the settlement asset.

Core Principle VI – Implementation summary

7.6.8 The most satisfactory settlement asset for systemically important payment systems is a claim on the central bank issuing the relevant currency. If other assets are used, considerations relevant to whether Core Principle VI is met are:

- the creditworthiness of the issuer of the settlement asset;
- how readily the asset can be transferred into other assets;
- size and duration of involuntary exposures to the issuer;
- risk controls, if any.

Box 11

Tiered settlement arrangements

While many systemically important payment systems settle all obligations across the books of the central bank, some systems use a combination of settlement assets, with some participants in the payment system settling across the books of the central bank (these are often termed "settlement banks" or "direct participants"), while other participants ("indirect participants") settle across the books of the direct participants/settlement banks. The settlement payments by each direct participant cover its own obligations and the obligations of any indirect participant for which it settles. This creates exposures between the direct participant and the indirect participants for which it settles, which can be extinguished separately.

There are a number of variations of these tiered, or agency settlement arrangements. In some net settlement systems, all the participants are recognised explicitly in the system's rules and all can be subject to the same risk controls. At the other extreme, there are systems which recognise only the direct participants. Other institutions (typically banks), which may or may not formally be termed "indirect participants", have an account with one of the direct participants and instruct the direct participant to make payments on their behalf; how they fund those payments is a matter between the two institutions.

Operators and overseers of systemically important payment systems need to consider both safety and efficiency when deciding on an appropriate structure for participation to meet the Core Principles. Core Principles VI, VIII and IX are particularly relevant, but, in some instances, control over financial risks (Core Principle III) or operational risks (Core Principle VII) may be further relevant considerations.

In terms of Core Principle VI, systems without tiering, in which all banks settle directly across the books of the central bank, provide a greater degree of safety to the participants in the system. This is because the settlement asset they hold at the conclusion of settlement is a risk-free claim on the central bank, rather than a claim on a commercial bank. Tiered settlement concentrates risks with the direct participants and can increase the possibility of widespread disruptions if liquidity or solvency problems occur at one such institution. These risks increase if direct participants provide settlement services to a large number of other banks. More generally, systems without tiering ensure that all payments are subject to the same rules and have the same certainty about when they are final.

The advantages and disadvantages of tiering have to be considered within the context of all the Core Principles. For instance, although there could be advantages for systems without tiering in complying with Core Principle VI, compliance with Core Principle VIII could suggest the opposite. For example, a system without tiering could be less efficient if small banks preferred on grounds of cost to use facilities provided by direct participants, rather than directly undertaking the investment in hardware, software and procedures necessary for direct participation and larger banks preferred to take advantage of the revenue-earning opportunities of offering settlement services to smaller banks. Participants, operators and overseers also need to consider whether liquidity management costs are affected by whether settlement is tiered. Core Principle VII might also be relevant, if operational risks could be greater in some systems if there were a large number of direct participants.

Core Principle VII - The system should ensure a high degree of security and operational reliability and should have contingency arrangements for timely completion of daily processing.

General

7.7.1 A systemically important payment system should be designed and operated with a high degree of security and operational reliability that is appropriate, in its particular case, to its context and to the needs of its users. The specific factors can vary greatly between systems. Moreover, technology is changing very fast throughout the world, changing both the nature of users' needs and the possibilities for meeting them. For these reasons, this section can discuss only in general terms the types of consideration which need to be addressed. It is common, but not necessary, for systemically important payment systems to be technically sophisticated and that is the central case addressed in this section. Many of the considerations, however, apply equally to similar system designs.

7.7.2 The policy choices involved in addressing issues of security and operational reliability need to be made taking account also of the issues of practicality and efficiency addressed in Core Principle VIII. These choices are typically the subject of consultation between the system operator and the participants, the outcome of which is agreement on specific policies and service levels in this area. Such an agreement would normally be reached at senior management level, in order to ensure that those who set the policies and service levels are those who also have the responsibility to maintain an appropriate balance between the costs of implementing the policies and service levels and the benefits of security and service continuity. The system's design and operation would also need to take account of any legal constraints, system rules, risk management procedures and business requirements relevant to security and operational reliability.

7.7.3 A payment system is made up of many distinct functions and components. It is a truism that the security of any system is "only as strong as its weakest link". Similarly, the operational reliability of a system is dependent on the operational reliability of all its components (including hardware, software, telecommunications network, power supply, staff). The designers and operators of a payment system, therefore, need to concern themselves not just with the security and operational reliability of the components of the central system, but also with components of the system's participants (including, where relevant, indirect participants). This concern can go beyond the participants' initial interface with the system, to include any of the participants' operations which could adversely impact the payment system. The system's participants thus have responsibilities for security and operational reliability in relation to the payment system as a whole, which need to be reflected in the relevant rules and contracts.

7.7.4 A payment system operator should monitor and assess whether the system is meeting its security policies and operational service levels. This needs to be a continuous and comprehensive process and might involve independent internal and/or external auditors (see Box 12). It also involves monitoring the security and operational reliability of the participants, for example the availability of their components during normal business hours. If a participant's performance were creating unnecessary risks for the payment system or other participants, the system operator might, for example, need to draw it to the attention of senior officials of the participant or, in particularly important instances, advise the system's overseer.

Box 12

Internal auditors

"Internal auditing is an independent, objective assurance and consulting activity designed to add value and improve an organisation's operations. It helps an organisation accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes."

The Institute of Internal Auditors

7.7.5 There are many relevant international, national and industry-level standards, guidelines or recommendations which are appropriate to the payment and banking industry. Compliance with such standards will help ensure a high degree of security and operational reliability. Standards have been issued by organisations such as the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC), the International Telecommunication Union (ITU), the Internet Engineering Task Force (IETF), the European Committee for Banking Standards (ECBS), the American National Standards Institute (ANSI), and the British Standards Institution (BSI); some examples are given in Box 13.

Box 13

International, national and industry standards, guidelines and recommendations

General

ISO/IEC DIS 17799-1 Information security management – Part 1: Code of practice for information security management

ISO TR 13569 Banking and related financial services – information security guidelines

BSI 7799:1999 Information security management

Security

ISO/IEC TR 13335 Information technology – security techniques – guidelines for the management of IT security

ISO/IEC 15408 Evaluation criteria for IT security

ISO/IEC 15446 Guide on the production of protection profiles and security targets

Quality assurance

ISO 9000 Quality management and quality assurance standard

Data

ISO 9364 Banking telecommunications messages – bank identifier code (BIC)

ISO 13616 International bank account number (IBAN)

ISO 13735 International business entity identifier (IBEI)

7.7.6 A system needs to have adequate numbers of well-trained, competent and trustworthy personnel. They must be able to operate the system safely and efficiently, and to ensure that the correct operational and risk management procedures are followed, in both normal and abnormal situations. Some of the personnel need to act as operational and security managers and have appropriate levels of knowledge, experiences and authority for those tasks. The training of personnel should include a wider understanding of payment systems and their importance, so that operational decisions are made in the right context. The staff responsible for the technical support of all components of the system should be available when required (including out of normal business hours) to correct errors and resolve problems.

7.7.7 A payment system's security policies and operational service levels are likely to be changed over time, in response to changes in the market for payment services (such as increased demand and new participants or customers), and also to technological developments which enable safer, quicker, more efficient or more cost-effective processing. This is easier if the design and operation of the system has been made suitably flexible to accommodate such changes.

7.7.8 A current trend in system design which raises particular considerations for security and operational reliability is the use of forms of "open systems" technologies (often referred to as "Internet technologies" or "web technologies"). They are increasingly popular because they facilitate ready access to and cooperative use of data and computing resources, but their use for systemically

important payment systems poses important challenges in designing appropriate operational integrity. Use of the Internet, in particular, raises special issues, because it has no clearly identifiable owner or operator and there are no safeguards (for example, guarantees) of service quality. More generally, use of such open systems technologies requires close attention to the implications of possible intrusion or other type of serious cyber-attack on resources (for example, the penetration of an electronic vault, the corruption of a database, a rogue code, or a denial of service attack). If these technologies were used for a systemically important payment system, contingency planning would have an important role to play. The system would, for example, need to develop capabilities for system-wide response to any such event, including the ability to mobilise relevant technical, business, human resources and legal capabilities rapidly and in a systematic fashion. Rather than rely solely on such contingency planning, a system could also, for example, include sophisticated capabilities to detect and counter intrusions. In addition, particular care might need to be exercised over the possible use of commercial off-the-shelf software, in connection with open systems technologies, for systemically important payment systems, because of the high standard of security and operational reliability all such systems require.

Security

7.7.9 Security objectives and policies need to be clearly defined and documented. Their details depend upon the particular payment system, its context and the needs of its users, but they should be sufficiently rigorous for the system operator, participants, customers and overseers to be able to have confidence in the system. A systemically important payment system's security objectives and policies are typically of a higher standard than most other systems, because of the importance of the business and the need to protect the integrity of payments. The security objectives and policies will apply to the system operator, the participants and perhaps also to any customers with direct access to the system or its data. They should be established during the design of the system, and be reviewed periodically, particularly when major changes occur to the system or its components. Security features should be tested regularly.

7.7.10 The security objectives and policies are influenced by the system's architecture and ownership. For instance, a highly centralised system (where the central components, network and even components at the participants' location are owned or operated by a single agency) can have highly centralised security objectives and policies. On the other hand, a distributed processing environment (where the systems' components can have many different owners and operators) requires a process to agree common security objectives and policies, a clear division of responsibilities for implementing them, and good co-ordination between the parties involved, so as to ensure that the overall operational management and control of the system is logically unified.

7.7.11 One aspect of security objectives and policies should be conformity to commercially reasonable standards, for example for confidentiality, integrity, authentication, non-repudability, availability and auditability. They need to include explicit policies for the control of both physical and logical access to the system, its hardware, software and network, to protect the system and its data from unauthorised actions by both external and internal parties. It is normal to limit access to the payment system strictly to those with a valid reason for access, and to the functions that are relevant to the particular individual.

7.7.12 There is an important role for regular analyses of security risk, using recognised and structured methodologies. Such an analysis should, for example, be carried out during the design of the system; and subsequently, when the system's business context changes, or when a substantive change to the system's design is proposed, as well as regular (for example, annual) analyses during the life of the system. Advances in technology can introduce increased threats to the system over time; they can also provide new or improved safeguards and controls. The system operator should, therefore, monitor technological advances actively to ensure that the system's security risk analysis is kept up-to-date. The typical elements of a security risk analysis are shown in Box 14.

Box 14

Typical element of a security risk analysis

- Set, or review, the system's security objectives and policies.
- Identify the system's functions, components, boundaries and areas of responsibility.
- Identify possible threats, and their magnitude (impact and likelihood).
- Identify existing or potential safeguards (such as physical devices, security software and organisational or operational procedures).
- Identify any residual risks and vulnerabilities.
- Repeat the last two steps until the residual risks and vulnerabilities are acceptable within the system's security objectives and policies.
- Implement within the system the safeguards identified by the risk analysis process.

Operational reliability

7.7.13 The standards of operational reliability required for the payment system should also be defined formally and documented by the system operator and participants, possibly as "service level agreements". These service levels could differ, for example, according to the system's promptness of settlement. For a real-time gross settlement system, the service levels could specify a maximum period of unscheduled "downtime", whereas, for a system with end-of-day settlement they could relate to the timing of that settlement. The level of operational reliability required could also depend on the availability of alternative arrangements for making the payments (such as another payment system) in the event of a serious failure of the system or its participants.

7.7.14 The operational reliability of a payment system relates not just to the components of the central system and the participants, but also to the operational reliability of the infrastructure services on which it depends, such as telecommunications, power supply and transportation (whether publicly or privately provided). Threats to service continuity can arise not just from the failure of these individual components and services, but also from external events such as industrial action, and general disasters such as fire, earthquake or flood. An important consideration during the design of the system should be to avoid a situation where the failure of any particular component or service would cause the whole system to fail (a "single point of failure"). All of these components and threats should be reflected in the systems business continuity arrangements (see 7.7.19 to 7.7.24).

7.7.15 The system operator should develop and use comprehensive, rigorous and well-documented operational and technical procedures. These need to include procedures to record, report and analyse all operational incidents. After every significant disruption to the payment system the operator and, if relevant, the participants should undertake a "post mortem" review to identify the causes, and any improvement required to the normal operations or business continuity arrangements.

7.7.16 Any significant change to the system and its components, including the components belonging to its participants, should be well documented, authorised, controlled, tested and subject to quality assurance procedures by the relevant parties. The development and testing of any change needs to be carried out in a way that does not impact the production system; such as using an entirely separate development system, built to replicate the production system as closely as possible, and subject to the same levels of security and control as the production system. Wherever possible, the implementation of any change should be carried out in a way that can be reversed, if necessary.

7.7.17 A system's design should ensure that it has sufficient capacity to process the expected volumes of payments with the required speed, particularly at peak times and days. The system operator should regularly monitor and test the system's actual capacity and performance, and plan carefully for any changes of volumes or business patterns, so that the required levels of payment throughput and speed are maintained.

7.7.18 The operational reliability of telecommunications facilities is generally critical for a payment system. Duplicate or alternative telecommunications and routing (for instance, the use of dial-up telecommunications as an alternative to leased lines) can, therefore, be useful. In most cases a payment system will depend on one or more telecommunications service providers, and on the reliability of the public telecommunications infrastructure. Where possible, a payment system operator should specify required service levels, alternate routings and contingency arrangements in its contracts with the telecommunications providers.

Business continuity

7.7.19 The purpose of a system's business continuity arrangements is to seek to ensure that the agreed service levels are met even in the event of one or more components of the system failing. The payment system operator and, where relevant, the participants and infrastructure service providers should carry out a formal exercise to plan arrangements to provide continuity of the service in a variety of plausible scenarios. These scenarios could involve the failure of each of the central components, the participant's components, and the infrastructure services used. Both internal and external threats should be considered and the impact of each failure identified and assessed. Arrangements to prevent, mitigate and/or react to the failure can then be developed. (Some examples of business continuity arrangements are given in Box 15.) Simplicity and practicality are key considerations when designing contingency systems and procedures; they need to work at times of stress and (despite training and testing) are inevitably less familiar to the personnel involved than the normal operating procedures.

7.7.20 All aspects of the business continuity arrangements should be clearly and fully documented. The staff of the payment system operator, and of the participants, should be thoroughly trained in their use. All elements need regular testing, involving the system's participants and any other parties who would be affected by the arrangements.

7.7.21 Procedures for the rapid formation of a multi-skilled crisis management team are an important element of such arrangements, including procedures for consultation with participants, overseers and other interested parties, as required. The arrangements could also, for example, include measures to inform the participants, their customers, other financial services, the overseers and the media rapidly and regularly about any incident and its impact on the payment service.

7.7.22 Where the business continuity arrangements include the diversion of critical payments to another payment system, this possibility should be discussed, agreed and tested in advance with the operator of that system, so as to prevent the diverted payments adversely affecting the performance of the other payment system.

7.7.23 It is often appropriate for a system's business continuity arrangements to include a second processing site. The design of the second site needs to take account of the time required to make it operational and to re-start payment processing. For a real-time gross settlement system, the second site could be maintained in "hot standby" mode, with the continuous transfer of data from the prime site, so that processing can resume in a matter of minutes. For an end-of-day settlement system the resumption time could be longer (possibly defined in hours rather than minutes). Second processing sites are generally designed to have identical software, hardware and telecommunications to the prime site (to simplify control, maintenance and testing). Identical software, however, is unlikely to provide protection against a software failure at the prime site. The location of a second processing site will depend on the nature of the threats it is protecting against. A common consideration will be protection against a failure of an infrastructure system (such as the power supply or telecommunications) impacting both prime and second sites. The system operator needs also to consider whether the participants should have a second processing site; such facilities could be provided by bilateral arrangements between the participants to use each other's processing sites, or by a central contingency site for use by any participant suffering a serious failure.

7.7.24 A payment system's business continuity arrangements could include a "minimum level service" to be used, in circumstances of severe disruption, to process a small number of critical payments (for instance relating to the settlement of other payment and settlement systems, market

liquidity or monetary policy). This minimum level service could be achieved, for example, through manual paper-based processing, authenticated facsimile messages, or a basic PC-based system using physical media for data transfer.

Box 15

Examples of business continuity arrangements

- Use of fault-tolerant or duplicated hardware.
- Regular preventive maintenance of all computer and telecommunications components.
- On-site supplies of spare hardware and telecommunications components.
- Internally generated or uninterrupted power supplies and an independent water supply.
- Fire detection and extinguishing systems.
- Clear and up-to-date documentation of procedures and technical documentation should be kept at both the primary and any secondary site.
- Procedures for taking regular copies of data, and copies of software when it is changed, critical components of which should be stored off the primary site.
- Procedures for the exchange of data by physical media (disks, tape, paper) in the event of telecommunications failure.
- Procedures for disabling certain system functions or participants, or starting or stopping certain processes out of sequence.
- When a new software, hardware or telecommunications component is implemented, the retention for a short period of the capability to revert to the old technology.

Core Principle VII – Implementation summary

7.7.23 The designers and operators of payment systems should consider the following issues in relation to security and operational reliability.

General

- The system should meet the security policies and operational service levels agreed by the system operator and participants, and relevant legal constraints, system rules, risk management procedures, business requirements, or international, national or industry-level standards.
- The system's security and operational reliability depend on both central system and participants components; the participants have responsibilities for security and operational reliability. The system should be formally monitored to ensure the policies and service levels are being met.
- Security policies and operational service levels should change over time, in response to market and technological developments; system should be designed and operated to meet such developments.
- The system requires adequate numbers of well-trained, competent and trustworthy personnel to operate it safely and efficiently in both normal and abnormal situations.

Security

- Security objectives and policies should be established during the design of the system, and reviewed periodically. They should appropriate to the payment system, recognising its particular architecture and ownership.
- System security should conform to commercially reasonable standards, for example for confidentiality, integrity, authentication, non-repudability, availability and auditability. Security features should be tested regularly.
- The system should be subject to regular security risk analyses. The system operator should pro-actively monitor technological advances to keep system's security risk analysis up-to-date.

Operational reliability

- Threats to operational reliability arise not just from the failure of central system and participant components, but also from failures of infrastructure services and natural disasters.
- The system requires comprehensive, rigorous and well-documented operational and technical procedures.
- Changes to the system should be properly documented, authorised, controlled, tested and subject to quality assurance.
- The system should be designed with sufficient capacity, which should be monitored and upgraded in advance of business changes.

Business continuity

- The system operator should carry out a formal business continuity planning exercise. Simplicity and practicality should be key considerations when designing contingency arrangements.
- Business continuity arrangements should be documented and regularly tested. They should include procedures for crisis management and information dissemination.
- Business continuity arrangements could include: diversion of payments to another payment system; a second processing site; and/or a "minimum level service".

Core Principle VIII - The system should provide a means of making payments which is practical for its users and efficient for the economy.

7.8.1 The first part of Core Principle VIII emphasises the need for a payment system to reflect day-to-day practical problems faced by users (including both system participants and their customers for payment services). The choices which are right for one economy are not necessarily right for another. For a system to be practical for its users, it needs to take account of the structure of the local market, its history and conventions, and reflect the current and prospective costs of inputs such as labour (including skilled labour) and technology. Judgements on the type of system that is appropriate to the needs of its users will require an understanding of practices, technologies and skills in the local banking sector. For instance, if users need to make only a small number of payments each day, implementation of elaborate systems that require extensive investment and training may not be appropriate. It would be possible to operate an RTGS system by maintaining a set of accounts in a physical book and simultaneously posting debits and credits (provided the legal underpinning for the entries was sound), although such a simple system would have severe constraints on volumes and would require participants to be able validly to instruct the book-keeper to make payments.

7.8.2 It is not always necessary to have highly sophisticated information technology. Systems that rely heavily on real-time communication and complex technology may not be appropriate in countries where power supply and telecommunications infrastructure are unreliable because the systems themselves are likely in turn to be unreliable and therefore not practical for their users. The actual choices facing a system designer may vary significantly, including choices between greater or lesser levels of technology, and degrees of centralisation of facilities, as well as a variety of choices over the design of the payment scheme (eg debit or credit mechanism, gross or net settlement, real-time or batch processing). It may also be necessary to recognise the differences in user requirements and provide for these differences. (Box 16 provides an illustration of an area in which attention can be given to practicality for users.)

7.8.3 Ensuring that systems are both practical to use and efficient and that they remain so as technology and other cost factors change presents particular challenges. For instance, procedures that rely heavily on manual processing may be appropriate for the economy at an early stage of financial market development and thus with few large-value or time-critical payments. They can quickly become less appropriate as the financial markets become more sophisticated and systems handle increasing volumes of more time-critical payments. At that stage, a system that was previously both practical and efficient is sometimes no longer adequate to the needs of its users or efficient for the economy.

7.8.4 Efficiency is a concept which is used widely and used in many different ways. It can be used as a technical measure of production – for example of the number of payments that can be processed in an hour, or the percentage of operating hours for which a system is fully available. It can also be used in the sense of cost-effectiveness, for example, as a measure of the cost per payment of operating the payment system. Economists use the term efficiency in the sense of a choice of a method of producing the payment services demanded, such that such services could not be produced at a lower cost to the economy.

7.8.5 In practice it is often very difficult to establish whether a systemically important payment system is efficient in this last sense because many aspects of the quality of the service which are demanded by users and which are difficult to measure. In addition, the resource costs of the various inputs need to be measured appropriately. The assessment becomes even more difficult when efficiency needs to be optimised over time. This is usually the case for major investment decisions where the demands are likely to change through the life of the system and the technological possibilities and the resource costs may change. But it is the right question to ask and the various other measures of efficiency may throw light on the choices. It is useful to set out in a structured framework the best available information about the costs and benefits of identifiable options as an aid to making decisions that will assist in meeting this Core Principle.

Box 16

Practicality for users: an example

The way in which system design can be practical for the system's users can be illustrated by the attention given in some systems to tailoring participants' communication links to the specific business needs of different participants. In real-time gross settlement systems and other systems with real-time messaging, participants incur costs in establishing real-time communication links with the central processing system. In some systems, participants have a choice between different types of links, each with its own implications for costs and for levels of services (eg real-time information, additional processing capabilities). Thus, large banks, with higher volumes and/or time critical or specialised transactions, may prefer to establish sophisticated links (eg computer-to-computer links) with the central system to connect to their back offices as well as to enable techniques like straight-through-processing. Participants with fewer transactions might, on the other hand, opt for simpler message transfer capabilities. In some systems, a further option for participants is reliance on specialised third party services to provide and maintain communication links.

A flexible approach to design, which allows different ways to access the system, can offer practical advantages for a variety of participants in a system that is also cost-efficient more broadly.

7.8.6 The relevant costs of using a system are borne not only by the operator and participants, but also by firms throughout the economy. A payment system will be efficient, in the sense used here, when the resources it uses are not being wasted, in that the payment services being demanded by users could not be produced by using less of the resources of labour, technology and finance individually or by combining them in a better way. There can be more than one efficient option and the choice will depend on the weight given to different qualities of the services provided to users, including its safety. If a payment system is cost-effective and practical to use, banks and their customers are more likely to use it. In some cases, making the system safer could make it more costly or difficult to use. Overseers in particular, need to be alert to the possibility that attempts to improve the safety of the system might unintentionally introduce disincentives to use the system, which might, in turn, reduce overall levels of safety in making the relevant payments.

Aspects of efficiency

7.8.7 Some helpful distinctions in analysing the efficiency of a payments system are those between:

- processing costs of the central system - which are directly determined by the operator;
- processing costs of the system's participants - which are external to the system but are often influenced by system design; and
- cost to participants of holding liquidity to fund payments.

7.8.8 Total processing costs of the system are the costs of handling the payment message, its clearing between banks, and preparing and executing the resulting settlement entries. These processes can be manual or electronic or a combination of both. They often involve significant fixed investment in equipment, telecommunications and maintenance. Designers and operators of systems have control over the explicit costs of providing centralised payments facilities such as system processing, telecommunications administration and governance. These costs are usually reflected in the fees and charges paid by the users for participation in the system.

7.8.9 Participants' internal processing costs can also be substantial. They can include preparing payment instructions, transmitting and receiving payment messages, internal processing, posting the relevant entries to customers' accounts, reconciliation and the costs of providing customers with the means to send and receive payments. While designers and operators of payment systems cannot control these costs directly, they need to be aware of how system design, as well as technology and procedures (such as straight-through processing), might affect costs since these are important components of participants' total costs and influence participants' choices about whether and when to use a particular system.

7.8.10 In many systemically important payment systems, which typically have higher values and, in some cases, lower volumes than other systems, the costs of processing can be less important to participants than the costs of providing liquidity to fund payments throughout the day.

7.8.11 Participants' liquidity costs will depend on two features of the system:

- how much liquidity the system's design requires each participant to hold in order to process its payments; and
- the terms on which the intraday liquidity, including central bank liquidity, is made available to the participants.

If the central bank levies an explicit interest charge, the cost to the participant is clear. Where no explicit charge is made but the central bank requires collateralisation of a daylight overdraft or provides a repo facility, the cost will depend on the alternative uses the participant could have made of the securities during the day.

7.8.12 Policies on provision of liquidity to the payment system usually focus on the terms by which the central bank is prepared to make the system's settlement asset, typically deposits at the central bank, available to participants during the day. Common policies include provision of intraday repurchase agreements (with incentives to reverse by the end of the day so that there are no flow-on effects to overnight markets that are the focus of monetary policy) or the provision of fully collateralised intraday overdrafts.[3] An alternative is for central banks to charge for intraday overdrafts to encourage participants to minimise their use and thus restrict the central bank's credit exposure.

7.8.13 System design can have a major impact on the liquidity costs borne by participants and their customers to fund their payment flows. For example, in systems with a queuing mechanism, the design of the queue can influence the amount of liquidity that each participant needs to hold to achieve a smooth flow of payments. Some systems allow relatively small payments to be settled ahead of larger payments that might block the flow of payments in a first in first out (FIFO) queuing system. Other sophisticated algorithms can reduce liquidity needs and speed up queues. The length of a system's operating hours can also be relevant to liquidity costs.

Aspects of inefficiency

7.8.14 Some indicators that processing of payments by the central system and by system participants may be using resources inefficiently include:

- poor operational performance because the system cannot cope with the level of demand, or because it has technical or organisational problems;
- poor operational performance even though volumes are manageable - for example, long or variable processing times, high levels of returned payments;
- persistently high levels of excess capacity – which can indicate wasteful investment in unnecessary processing capacity (though judgements should not be made too early in the life cycle of a system because it may take some time for traffic to build up);
- high costs, possibly reflected in charges, compared to systems with comparable services elsewhere.

[3] Most central banks have policies that separate the implementation of monetary policy from the provision of intraday liquidity to the payment system. Monetary policy is typically implemented through influencing an overnight market rate, such as the rate of which commercial banks lend to one another.

7.8.15 Some indicators that the system may be making inefficient use of liquidity and so imposing unnecessary costs on users include:

- payments held up in queues in real-time gross settlement systems because participants do not have appropriate access to intraday liquidity to allow payments to be settled promptly; or
- participants having to hold very high levels of intraday liquidity because the queuing mechanism is inflexible.

Avoiding inefficiency

7.8.16 The development of systemically important payment systems is rarely left entirely to market forces. With its key role at the core of the financial system the central bank is involved as overseer if not as operator. But because so many of the processing and liquidity costs are borne directly by participants rather than by the operators, participants need to be closely involved in the design and implementation of the system if resources are to be used efficiently. A degree of cooperation, consultation and co-ordination of plans will be necessary as the payment demands of the relevant market are assessed, and systems designed and implemented.

7.8.17 The benefits of undertaking a cost-benefit analysis of a proposed project for payment system development or reform can be substantial. This can be the case even if the analysis has to be relatively tentative because many aspects are difficult to quantify. Undertaking a cost-benefit analysis forces the designer to identify the entire range of costs faced by the operator, participants and other users of a payment system. These costs should be assessed in relation to the safety and efficiency benefits to the ultimate customers and society. The scale of co-ordination typically needed in payment reform projects usually means that implementation can take some time and a cost-benefit analysis needs to consider the time horizon over which the investment needs to be made and the benefits recouped. This makes it particularly important for planners and analysts to assess future as well as current payment needs of the business and financial sectors as the economy develops. See Box 17 for a discussion on the use of cost-benefit analyses.

7.8.18 Both private and central bank operators of payment systems should make use of market disciplines where possible. This will not always be easy because in some cases there is only one systemically important payment system in a country and it thus has no direct competitor. Nevertheless, there will still be some opportunities to allow competition to promote efficiency in some aspects of the system's operation. For instance, the banks which use the system will compete with one another to provide services for their customers. Another opportunity is for the operator to use competitive tendering for the provision of services to it. Where there is no direct competition to a single system, whether it is privately or central bank operated, the operator has a particular responsibility to ensure that the system remains responsive to the demands of users and operates with an efficient use of resources. One way in which to do this is to benchmark the system's services, performance, costs and charges against those operating in comparable economies.

7.8.19 If resources devoted to payment systems are to be used efficiently, it is important that the costs of providing services are signalled as clearly as possible to participants. This can be difficult, especially when substantial overhead costs have to be allocated to a number of different payment (or other) services, but efforts should be made to have the prices of services reflect the resource costs of providing them. Payments services are sometimes subsidised or cross-subsidised, often in an attempt to encourage a short-term shift in behaviour on the part of participants. Sometimes subsidies can be justified on the grounds that the costs will not be borne by those who generate them or that those who incur costs cannot reap their benefits. Alternatively, they can sometimes be justified by wider social benefits, such as the need to develop and support a local money market, or other externalities of that type. Nevertheless, operators that subsidise or cross-subsidise should be clearly aware of the risk of sending misleading price signals and the difficulty that they are likely to encounter later in dismantling them. Also, if subsidies or cross-subsidies are more than short-term expedients, operators and central banks as overseers should be aware that the absence of that discipline which comes from the

possibility of competition (even if not from actual competition) poses a risk to the efficient use of resources. (See also Box 18 for a discussion of approaches to pricing.)

Box 17

Cost-benefit analysis in payment system reforms

Cost-benefit analysis can provide a useful framework for assessing prospective investments in payment systems, but it is only as good as the data used and the assumptions made, so that it needs to be used with care. It can give a spurious impression of accuracy, but, if it is used properly, it can inform judgements about the merits of alternative investment proposals. Cost-benefit analysis involves projecting the benefits and costs associated with a project over some period of time (the time horizon), discounting the benefits and costs to their present values using some discount rate (interest rate, social rate of time preference), and calculating whether the present value of the benefits exceeds the present value of the costs. If the decision involved is a choice between alternatives to attain some desired end, then the ratios of benefits to costs of the different alternatives are ranked and the one with the highest ratio is selected.

On the cost side, inputs have to be identified and priced at what they are worth in alternative uses (their opportunity cost). In most cases it would be satisfactory to use the market price (or rental) for the input. But where there is no market for the input or the market price is judged not to reflect the opportunity cost of the input (because of factors such as monopoly, taxation or subsidisation) use of some alternative price (shadow price) is recommended.

It is critical that benefits are carefully assessed. The benefits reflect the underlying demand for the project. If the benefits cannot be identified, there must be some doubt that the project is worth pursuing. The benefits from a payment system reform project could include reduced processing costs, reduced risk, increased reliability, and new types of instruments.

For both benefits and costs, monetary values have to be calculated to do cost-benefit analysis, and this is not easy even under the best of circumstances. Difficulties in valuation, both for benefits and for costs, arise from several sources. On the benefit side, the task amounts to estimating the value to society, namely, what society would be willing to pay for the benefits. This information can be gleaned through (1) surveys; (2) comparing what potential demanders are paying for similar services, in this and other economies, in relation to, say, gross domestic product or per capita incomes. Not surprisingly, these exercises are fraught with uncertainty arising from changes in taste, relative prices, and technology. Some benefits are intrinsically difficult to quantify. In payment systems an obvious example is reduction of systemic risk. To address this type of problem, the benefit-cost calculations could be done with different scenarios each using different assumed values for the benefits that are difficult to quantify. If this valuation has to be “unreasonably high” for the project to pass the test for approval, this would suggest it should not proceed.

The benefit-cost ranking of alternatives can be greatly influenced by the length of the time horizon and the rate of discount used in the analysis. The shorter the time horizon – that is, the time period over which the benefit-cost calculations are made – and the higher the discount rate, the higher would be the benefit-cost ranking of those alternatives yielding their net benefits (benefits minus costs) streams mainly in the near future relative to those alternatives that yield their benefits in the more distant future. The public sector also has an important choice of whether to use a risk-free rate (which might be appropriate if there is actual or potential public sector competition in providing the services) or a rate closer to commercial rates. These are technical points and consequences of the mathematical calculation of present values, but they have important implications for policy. For instance, uncertainty about the future often leads decision-makers to lean toward relatively short time horizons. Also, the length of the period before the investment begins to yield benefits (the gestation period during which costs are being incurred without any real benefits), can differ markedly between alternatives under consideration.

Apart from the above sources of difficulty in making benefit and cost calculations, another source is indivisibility (lumpiness of projects). This is a problem especially for some technological choices, but it could also arise in the case of institutional choices such as major legal reforms. In essence, choices must be made among units that are lumpy and often very expensive, since it may not be optimal or technologically possible to split up such units into smaller, less expensive components among which only some need be acquired. In such cases the cost-benefit calculations need to reflect the actual choice between groups of projects. Cost-benefit analysis does not resolve the practical difficulties of assessing alternative investment choices but it provides a structure for doing that work.

Box 18

Pricing payment transactions

Pricing polices determine the cost of transactions to the users of the system and can create incentives for participants to use one system rather than another. This can have an effect on the promotion of safety and efficiency overall. Inappropriate pricing policies could either discourage the use of alternative more efficient systems (so wasting resources and imposing an implicit tax burden on the private sector) or drive users to cheaper but less safe systems (if account is not taken of the collective benefits of safety features). As systemically important payment systems are usually few in number, so that typically there are only a small number of alternatives available, there can be a wide range of possible approaches to pricing.

In general, payment system operators could adopt one of the following approaches:

1. **Cost recovery method**: This would involve recovery of the total costs (fixed and operating cost) over a defined time-period on a break-even basis. Costs to be recovered could be allocated by estimating the unit cost per transaction and pricing it accordingly. This would require a reasonable forecast of the likely volumes to be achieved in the given time frame. Alternatively, costs could be allocated equally between the participants or proportionately to the volume or value of transactions. At-cost pricing may be used by non-profit organisations, typically a cooperative of the users or, by central banks with a view to providing services that promote the effective functioning of the money market.

2. **Market based pricing**: Pricing would typically be on a per transaction basis and would involve cost and volume estimates as in the previous case. However, the price would include total costs plus a surplus, which is determined by competitive market conditions or by appropriate return-on-capital consideration. This approach, whether adopted by the central bank or by a private sector operator would enable there to be a level playing field among competing service providers and would create incentives for innovation and development of services.

3. **Subsidised pricing**: Central banks or public sector operators could subsidise the costs of payment services in order to develop financial markets or to encourage financial institutions to migrate to more secure and efficient payment channels. See section 7.8.19 for a discussion of policy considerations relevant to subsidised pricing. If an operator decides to subsidise, it may be useful and appropriate to define explicitly the extent of the subsidy as well as the period for which it will apply. In carrying out any cost-benefit analysis (see Box 13), the amount and the duration of the subsidy must be taken into account.

The choice of approach will depend in part on whether there are competing systems and on an assessment of whether they involve risks and benefits which are borne more widely than by their participants. Within this broad framework, the pricing structure could be varied to create appropriate incentives for the effective functioning of the system. Operators can also use differential pricing mechanisms to improve the daily throughput of payments, such that payments submitted earlier in the day are less costly than those submitted later. Similarly, transactions could be priced according to volume or value ranges to achieve better queue management. Price differentials could also be based on the level of service, for example, to take account of value-added services such as additional information or computer-to-computer links.

Core Principle VIII – Implementation summary

7.8.20 General

- Define objectives (identifying risk and efficiency factors)
- Identify user needs and constraints.
- Identify system choices and benefits
- Determine social and private costs
- Develop decision choices

Analytical framework

- Identify efficiency requirements (or conversely identify inefficiencies)
- Identify safety requirements
- Evaluate costs (social and private)
- Identify resources (social or private)
- Determine practical constraints (technology, infrastructure)
- Define safety constraints (eg applying the Core Principles)

Methods

- Cost-benefit or other structured analysis
- Involvement of participants and/or users in discussions
- Methodology for data collection and analysis
- Identify data sources (archived data, economic data, samples or estimates)

Core Principle IX - The system should have objective and publicly disclosed criteria for participation, which permit fair and open access.

7.9.1 Core Principle IX recognises that competition among banking organisations, in the provision of payment services as elsewhere, normally serves to promote economic efficiency in the sector. In many countries economies of scale result in there being only a small number, and possibly only one, systemically important payment system. As a result, participation in such systems can have a significant influence on the competitive balance among organisations offering payment services. This is not to say that participation is necessarily the only means of access for a bank or other payment intermediary. In many instances, such an institution can choose to access a system as a customer of a participant. Some systems also have two levels of participation, direct and indirect (see Box 11).

7.9.2 Core Principle IX also implicitly acknowledges that other Core Principles call for the management of risks, including both financial and operational risk and that this can affect the terms of access to a system. For example, access criteria can be based on risk measures such as capital ratios, risk ratings or other indicators. In addition, Core Principle VIII is concerned with efficiency, which can also affect the most suitable terms of access. For example, a case can sometimes be made, in the interests of operational efficiency, for the participation criteria in a payment system to include factors such as minimum payment volumes.

7.9.3 The typical rationale for a relatively restrictive approach is that certain types of institutions, for example large, highly creditworthy banks, present the least risk to the payment system and process the largest volumes of interbank payments. The payment system can then be designed around a model where there will be only a few low risk and high volume participants in the system, thus simplifying both risk management and operational design. There are, however, a number of disadvantages to such an approach:

– It ignores the competitive impact on those banks that are excluded - smaller banks and perhaps the branches of foreign banks – and their customers;

– It can tend to perpetuate concentration of banking, increasing the likelihood that a few banks will be perceived, by an invalid assumption, to be "too big to fail";

– Some of the criteria used (for example, balance-sheet size) may, in any event, be poor indicators of risk.

7.9.4 Access criteria that have this type of restrictive effect deserve careful scrutiny, particularly when larger banks own and operate the system. Restrictive access criteria may be motivated by a desire to retain the benefits of investment in innovation; banks which did not help to build and finance the system could, in effect, receive a "free ride", if they were able to participate in it on the same basis. This concern can, however, be addressed in ways which do not restrict access, for example through the pricing structure.

7.9.5 A contrasting approach used by some central banks that operate systemically important payment systems is to provide access to all financial institutions in a particular category. Typically this category includes, at a minimum, deposit-taking banks and credit institutions of all sizes. Payment system design is then adjusted to take account of the risks presented by the eligible institutions. Service arrangements, and possibly pricing, can be adjusted to allow for different levels of service and transaction volumes.

7.9.6 In practice, the choice of approach is often subject to constraints deriving, for example, from competition law or central bank law. Taking any such constraints into account, one possible way to address a trade-off between open access and risk is to select risk management and other operational arrangements that have the least restrictive impact on competition that circumstances permit. For example, instead of relying heavily on access criteria to limit risks in a payment system, risk-related controls over credit and liquidity risk can be used. The more effective are such risk-related controls, the less restriction is necessary on access. Real-time gross settlement systems with risk-related controls over credit extensions, for example, have served this purpose in some countries. Many central banks that provide intraday credit require full collateralisation of such credit in order to minimise credit risk to the organisation.

7.9.7 There has been debate in many countries over whether organisations such as securities firms, other regulated financial institutions, and even unregulated entities should be admitted as participants in systemically important payment systems. In some countries, for example, securities firms are admitted to such systems, or to a companion securities settlement system, in order to ensure the safe settlement of transactions in government securities. Sometimes their participation can be on restricted terms, for example without access to the intraday liquidity facilities available to banks. The principle of adopting the "least restrictive alternative" means to control risk could also be used to justify selectively widening access beyond banks. On the other hand, widening the categories of institutions with access to core payment systems, which often include access to central bank systems and possibly central bank credit, raises institutional issues that go beyond the scope of this report.

7.9.8 As access criteria need to be applied continuously, not only when an institution makes an initial application, there is a related need for exit criteria. In systems which have access criteria related to risk, for example based on risk ratings, the exit criteria typically allow the risk ratings of participants to fall somewhat below the level required to permit initial access. This reflects the fact that the financial condition of participants can vary over time and that an unnecessary crisis of confidence could be triggered if a participant is excluded from participation because it is temporarily below the risk-rating criterion. At the same time, caution has to be exercised not to increase the overall risk to a system, and risk mitigation steps, such as posting collateral to secure obligations, may need to be taken when these events occur. It is usually advantageous to specify the range of possible steps clearly in the system's rules.

Core Principle IX – Implementation summary

7.9.9 Access criteria should encourage competition among participants, without compromising the system's safety. Criteria that restrict access should be assessed for:

- justification in terms of safety;
- justification in terms of efficiency;

and consideration should be given to adopting forms of risk management which have the least restrictive impact on competition that circumstances permit.

Core Principle X - The system's governance arrangements should be effective, accountable and transparent.

7.10.1 The quality of governance arrangements[4] is important for all private and public sector institutions and organisations. For systemically important payment systems, effective, accountable and transparent governance is particularly important, because there are normally only a very few such systems in a country, the services they provide involve large values, and they give rise to interdependencies among participants.

7.10.2 Governance arrangements for systemically important payment systems vary widely between countries, and sometimes between systems in a single country. Effective implementation of Core Principle X does not depend on the detailed form of the arrangements, which may be determined by specific legal or regulatory requirements, but on the quality of the results they deliver. Good governance arrangements provide a sound basis for compliance with the other nine Core Principles and help the system meet the needs of the community it serves.

7.10.3 The particular governance arrangements, and the problems they must confront, depend in large part on the form of ownership of each payment system. Some of the most common are:

- *Central bank-owned* systems. These are perhaps the most common, particularly as RTGS systems have become more common. Because RTGS systems involve the real time debiting and crediting of accounts at the central bank, the central bank determines the regulations and procedures under which this takes place, and often controls the associated technical infrastructure. Examples include BI-REL (Italy) and BAHTNET (Thailand).
- *Privately-owned systems*. Within this category there are two classes. Particularly common are systems *owned by their participants*. Examples include CHIPS (US) and LVTS (Canada). Also possible are systems operated as *independent corporations* and owned by shareholders who are not necessarily users of the system.
- *Jointly*-owned systems in which the central bank and private participants either own the infrastructure jointly, eg CHATS (Hong Kong) and ELLIPS (Belgium) or separately own the various parts of the system *which* make up the whole, eg CHAPS (UK).

Many of the techniques of effective, accountable and transparent governance are common to all forms of ownership.

7.10.4 The different forms of ownership can, however, raise particular issues that require somewhat different governance tools to achieve similar results. Some techniques applicable to systems with many shareholders, who are also the system's participants, may not be practical for a central bank-owned system, and other techniques need to be explored.

7.10.5 No matter what the ownership structure, the results of good governance should be similar, and similar indicators can be used to measure the success of system's governance.

Governance tools

7.10.6 All systems can use a range of tools to ensure *effective* governance. The detail will depend on the nature of the system, the culture of the country and the particular organisation, but a number of tools or techniques have proved to be effective in a wide range of settings. (Some of these are set out in Box 19.)

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4 For a discussion on the subject of promoting sound corporate governance practices, see *Enhancing Corporate Governance in Banking Organisations*, BIS, September 1999 issued by the Basel Committee on Banking Supervision, available on the BIS website (http//: www.bis.org) and *OECD Principles of Corporate Governance*, May 1999, issued by the Organisation for Economic Co-operation and Development, Paris, available on OECD website (http//: www.oecd.org).

Box 19

Governance tools

Tools of effective governance include:

- Written strategic objectives and plans for achieving them.
- Reporting arrangements that assess the actions of senior management against the strategic objectives.
- Clear lines of responsibility and accountability within the organisation and appropriate management controls, together with arrangements for their enforcement.
- Requirements that management at all levels is appropriately qualified and supervises the system and its operations competently.
- Risk management and audit functions independent of those responsible for day-to-day operations. (The risks with which these functions should concern themselves include the legal, financial, operational and security risks discussed in this report.)

7.10.7 The resources and the level of oversight/control devoted to the activities described in Box 19 should be appropriate to the importance and complexity of the payment system and its market. For example, in some systems, it may be sufficient to draw on the expertise of one or two people to fulfil risk management or audit functions, whereas, in more important and complex systems, not only do the resources committed to risk management need to be more significant, but oversight/control of those activities may be more appropriately undertaken by committees of members of the governing body to fulfil these functions. External auditors can also play a role.

7.10.8 Some of the tools of effective governance listed above also have a bearing on the system's *accountability*. Those who comprise the governing body of a systemically important payments system should be accountable both to the system's owners and to the wider financial community. Being accountable in this context entails having to justify major decisions and actions to these other parties. It is important that those served by the system should be able to influence its overall objectives and performance. This can be achieved by various means depending on ownership. Representation on the governing body is one such means. Some structured forum for wider consultation can also be useful.

7.10.9 Governance arrangements for all systemically important payment systems should include a mechanism for ensuring objective and independent oversight/control over management. Such arrangements should ensure that management has the proper incentives to act in the interests of stakeholders and should include appropriate checks and balances for decision-making such as a system of internal controls, risk management, and audit reviews.

7.10.10 Public disclosure of certain types of information about the system can assist *transparency*. Examples are:

- governance structure (size of the governing body, membership, qualifications, selection process and committee structure, terms of office and the conditions of removal);
- senior management structure (responsibilities, reporting lines, qualifications and experience);
- basic organisational structure (line of business structure, legal entity structure);
- design of risk management (rules and procedures); and
- design of internal control systems.

Central bank-owned systems

7.10.11 The precise governance arrangements for a central bank inevitably have to reflect the wider constitutional arrangements for the institution. In practice, achieving some of these payment system governance objectives can be straightforward for central banks. Others can entail greater challenges. For example, the central bank may well be subject to arrangements which ensure it is transparent about

its plans and operations. On the other hand, the methods of achieving accountability need to take into account that there is no clearly defined external group, such as private shareholders, to whom the central bank can be held formally accountable in its capacity as system operator. While private sector payment systems are usually operated as separate companies with their own board of directors, whose obligations are set out in company law, systems operated by central banks are often operated within a department of the central bank. The central bank's independent internal audit function, and/or oversight by a department separate from the operating department, can provide an effective external element in the governance arrangements. The central bank could also take steps to obtain the opinions of participants and other parties interested in the operation or reform of its system. Steps might include setting up formal consultative arrangements that provide the opportunity for participants and others to provide input to and feedback on major decisions. There can also be other means for the central bank to understand the preferences of users; for example through less formal dialogues directly with individual users or by surveys to obtain their views. The publication of regular reports on the system or discussions with user groups that allow external assessment of its compliance with the Core Principles can be another effective means of providing accountability and transparency.

7.10.12 A central bank should seek to avoid any impression that it might use its role as overseer of private sector systems to support unfairly the operation of its own systems. A central bank needs to be clear when it is acting as regulator and when as owner and/or operator. This can be facilitated by separating the functions into different organisational units, managed by different personnel. Where there is competition with private sector systems, central banks should be especially careful to protect confidential information about external systems collected in its role as payment system overseer and to avoid its misuse.

Privately-owned systems

7.10.13 Most privately-owned systemically important payment systems are owned by their participants, that is, normally, by the banks which are most important in the country's wholesale payments business. Often the governance structure resembles that of a cooperative, with the governing body being elected by the system's participants and consisting in large measure of their senior staff. Members of the governing body should be appropriately qualified for their positions and have a clear understanding of their role in the system's governance.

7.10.14 These arrangements can raise particular governance issues. Because directors are usually nominated by participants, they may have conflicts of interest in overseeing or governing a payment system that arise because (1) they represent organisations that compete with other owners and/or (2) the interests of the company operating the payment system may not coincide with those of the director's employer. It is possible that this problem cannot be fully avoided, but it can be addressed by adopting clear and transparent policies in this area.

7.10.15 Systems owned by their participants may also need to make special efforts to seek the views of a wide range of users, especially if a small number of larger participants dominate the decision-making process because of voting rules linked to transaction volumes or values. The governing bodies of such systems might not, for example, have appropriate incentives to avoid inefficiency – see paragraphs 7.8.18-7.8.19. In these circumstances, governance arrangements may need to give special consideration to the role of smaller participants.

7.10.16 Another common way of providing external views to the governing body of a mutually-owned system is to include the central bank as a member, because of its role as the settlement institution and the broader policy perspective it can bring to decision-making.

7.10.17 Systems owned and operated by arms-length suppliers, are less common than those owned and operated by system participants. In such cases, there may need to be structured means of consulting participants and other stakeholders. Public disclosure of relevant information can also be particularly important.

Jointly-owned systems

7.10.18 Jointly owned systems may need to address many of the issues faced by privately-owned and by central bank-owned systems. It is of particular importance for a central bank to make a clear distinction between its activities as joint owner and its role as overseer of the system. In both capacities, the central bank has responsibilities to ensure that the system complies with the Core Principles (see Responsibilities B and C). There need to be arrangements to ensure efficient and effective governance of the system as a whole and also of the constituent parts, particularly where joint ownership entails a division in operational responsibilities. In such cases there is a particular need for clear accountability for those managing the individual components of the overall system. Effective consultative procedures, central bank involvement in the governance process, and the disclosure of internal control procedures and performance against strategic objectives can all be important elements of this process.

Core Principle X - Implementation Summary

7.10.19 In contrast to many of the other Core Principles, it is difficult to advise on the appropriate structure of governance, because there are so many possible arrangements. It is, however, possible to suggest indicators that governance arrangements are effective, accountable and transparent. It is advisable for governance arrangements to be reviewed regularly against such indicators. The following is not an exhaustive list of indicators, nor does any one of these factors alone necessarily indicate whether the system complies with Core Principle X:

- Relevant information on the system and its operations is readily available, complete and up to date;
- Major decisions are made after consultation with all interested parties and due deliberation;
- The high-level decision-making process is prompt and communicated clearly to the system users;
- The system consistently attains projected financial results and can explain any differences from those plans;
- The system delivers payment services that satisfy customer needs;
- The system complies with the other nine Core Principles.

Section 8: Responsibilities of the central bank in applying the Core Principles

8.1 The leading role of central banks in pursuing the objectives of safety and efficiency in payment systems was traced in paragraph 2.6 of Part 1. The four central bank responsibilities in applying the Core Principles to systemically important payment systems stem from this leading role. A distinction is drawn (in Responsibilities B and C) between those systemically important payment systems which are operated by the central bank and those which are not. The central bank has different responsibilities in these two cases but, in both cases, the central bank's objectives are safety and efficiency and the Core Principles need to be applied.

8.2 Central banks have long had the role of providers of settlement accounts to payment systems and many have also been their operators. It is only relatively recently, however, that the dual objectives of safety and efficiency have been recognised explicitly and that the distinctive role of payment system oversight has begun to be recognised and defined. Most central banks now recognise the oversight of systemically important payment systems as a core function, contributing to financial stability and complementing the implementation of monetary policy. This reflects the critical role of safe and efficient payment systems for the effective implementation of monetary policy and the stability of the financial system. A central bank's oversight role can be carried out within a variety of different legal and organisational frameworks. The relative newness of this function makes especially important the emphasis on definition and on public disclosure in Responsibilities A, B and C. These notions of transparency were developed in parallel with the work of the IMF on its Code of Good Practices on Transparency in Monetary and Financial Policies[5]. Box 20 discusses the interrelationship between this report and the Code.

Box 20

IMF Code of Good Practices on Transparency in Monetary and Financial Policies (IMF Code)

The IMF Code (adopted by the Interim Committee in September 1999) identifies desirable transparency practices for central banks in their conduct of monetary policy and for central banks and other financial agencies in their conduct of financial policies. Payment system oversight is included among the activities of financial agencies that are covered by the Code's good practices on transparency in financial policies. The most explicit references are in section 5 of the Code, which deals with the clarity of the roles, responsibilities and objectives of financial agencies and of self-regulatory organisations authorised to perform elements of regulation/supervision. The following good practices in this section are of particular relevance to payment system oversight:

5.3 The role of oversight agencies with regard to payment systems should be publicly disclosed.

5.3.1 The agencies overseeing the payment system should promote the timely public disclosure of general policy principles (including risk management policies) that affect the robustness of systemically important payment systems.

This report recognises the value of transparency as a support for the formulation of good policies. In particular, there are close parallels between, on the one hand, the Code's emphasis on clear definition of broad objectives and of the institutional framework which are reflected in good practices 5.3 and 5.3.1 cited above and, on the other hand, Responsibility A in this report.

Other good transparency practices identified in the Code can also support central banks' exercise of the other responsibilities set out in this report. For example, the good practices in section 5 of the Code which concern the public disclosure of relationships between financial agencies and between financial agencies and self-regulatory organisations (good practices 5.2 and 5.4) can support the central bank's responsibility (Responsibility D) to cooperate with other relevant central banks and other authorities.

[5] Available on the IMF website (http//: www.imf.org)

8.3 Central banks often cooperate with private sector organisations in providing payment systems. In some cases central banks outsource technical operational functions to private sector parties and occasionally private-sector operators sub-contract such functions to the central bank. The operator responsible for compliance with the Core Principles is the party with the rule-making authority and the direct relationship with the participants. The central bank will be involved with any systemically important payment system either as operator (Responsibility B) or as overseer (Responsibility C).

8.4 It is important that central banks exercise their responsibilities (whether as operators or as overseers) in the context of the overall financial infrastructure in the country. For example, in applying the Core Principles, it may not be possible (or it may not yield an appropriately safe or efficient result) to look at the features of a single systemically important payment system on its own, as there can be significant interactions between one system and other elements of the financial infrastructure. Such as linkages could arise, for example, between payments made in the system and the settlement of securities, or from the system's role in effecting the net settlement at a particular time of day for other payment systems which are not necessarily themselves systemically important.

8.5 Central banks cannot exercise their responsibilities in isolation. Responsibility D recognises explicitly the need for cooperation between the central bank (in its capacity as overseer and/or as operator) and other authorities. In addition, the central bank may need external assistance to ensure a system's compliance with the Core Principles. For example, if, in assessing the system's legal soundness with a view to ensuring that it satisfies Core Principle I, the central bank concludes that the system's legal basis is deficient, it may be possible in some cases to remedy the problems by amendments to the system's rules or by administrative action, but in other cases the central bank may conclude that provisions of the law need to be changed. If the law needs to be changed, relevant areas of government and the legislature need to be convinced of the importance of the problems and agree to remedy them.

Responsibility A - The central bank should define clearly its payment system objectives and should disclose publicly its role and major policies with respect to systemically important payment systems.

8.1.1 Responsibility A addresses central bank involvement in the payment system, covering its objectives, role and major policies. The central bank's objectives are the high-level goals it pursues and they guide the central bank's payment system activities. The objectives provide the foundation for the central bank's relationship with the payment system and are unlikely to change significantly very often. To fulfil these objectives, central banks can play various roles related to systemically important payment systems, including those of owner, operator, overseer, settlement institution, and liquidity provider. Central banks often set policies for their own systems and for systems they oversee which help implement the central bank's objectives. These policies could include setting specific standards, such as satisfying these Core Principles.

Defining objectives clearly

8.1.2 If a central bank's payment system objectives are defined in a clear way, they provide a basis for consistent policy making and provide a benchmark by which the central bank and others can judge its success in achieving them. There are various ways in which central bank objectives can be established. Some objectives can be established by legislation (see paragraph 8.1.8 below), but some or all are set by the senior management of the central bank, who are well placed to balance the formulation of these objectives with the central bank's other main objectives.

8.1.3 An example of a payment system objective would be the adoption by a central bank of the objectives described in this report: safety and efficiency in systemically important payment systems. Other possible objectives, which might or might not be the responsibilities of the central bank, include protecting consumer rights, and preventing fraud and money laundering.

8.1.4 The central bank's objectives also need to be understood by payment system participants and by any private sector operators of payment systems. The information should also be available to users and other interested parties. Disclosing the objectives gives a degree of assurance to the private sector that the policy environment will be predictable, encourages behaviour by the private sector that is consistent with the stated policy, and provides a foundation for investment in payment systems. The means of disclosing objectives vary quite widely. In some cases a relatively informal approach can be adopted, by way of speeches by senior officials; in others it is somewhat more formal, being set out in official publications, for example in the central bank's annual report, or in press releases.

Disclosing roles and major policies

8.1.5 The central bank should also disclose publicly its payment system roles and the major policies it will follow in order to achieve its objectives for systemically important payment systems. These are likely to involve more detail than the high-level aims. As with central bank objectives, some of its payment system roles may be established and disclosed through legislation. The legislative framework, however, is not likely to be able to cater for all eventualities and any roles that are determined by the central bank itself should also be publicly disclosed.

8.1.6 The disclosure of major policies should include identifying systems which are systemically important, together with reasons for the judgement. Participants in such systems and any private sector operators need to be made aware whether their system is judged to be systemically important and, if it is, that the system will be expected to comply with the Core Principles. Other major policies which could appropriately be disclosed include the policy the central bank will follow if it judges that some systems do not comply with the Core Principles or policies relating to a particular programme of payment system reform or development.

8.1.7 It is important that the central bank's major policies be set out in writing and be equally available to all interested parties. It is unlikely to be sufficient to communicate them only through informal discussions with participants and operators or through bilateral correspondence. Active consultative procedures can also be a useful tool to support disclosure. In some countries, central

banks consult interested parties before detailed policies are finalised, in order to build support for these policies and to avoid unintended effects on private sector operators or on the system's participants.

8.1.8 One means of defining objectives and roles is through legislation. Central banks' traditional areas of responsibility, such as monetary policy, are generally set out clearly in the legislation under which they are established or in related legislation which gives them particular responsibilities and powers. In an increasing number of cases this is also true of the central bank's role in payment systems. Sometimes this legislation specifies the central bank's high-level objectives. This approach helps to satisfy Responsibility A by making clear the role and objectives of the central bank in payments systems. (Box 21 describes recent examples of legislation related to the central bank's role as overseer.)

8.1.9 One effective way to ensure that objectives, roles and major policies are clear and consistent is for the central bank to write a single document that clearly describes them, their sources and how they will be carried out in practice.

Responsibility B - The central bank should ensure that the systems it operates comply with the Core Principles.

8.2.1 The central bank should ensure that any systemically important payment system it operates complies with the Core Principles. This applies to all system types, whether real-time gross settlement, net settlement or hybrid. Because the features of each system vary from country to country, every systemically important payment system needs to be separately evaluated against the Core Principles. Where the central bank finds that a system is not in compliance, it needs an action plan to achieve compliance within a reasonable time period.

8.2.2 Compliance with many of the Core Principles is directly under the central bank's control - for example, those Core Principles dealing with risk information and controls (Core Principles II and III). Indeed, the central bank has unique control over the settlement asset preferred in Core Principle VI. In these cases the central bank can readily take whatever actions are necessary to ensure that the systems it operates comply with the relevant core principle. Among the other Core Principles, some raise questions of judgement for central banks which are similar to those for private operators, for example in respect of Core Principle VII about operational risk. If the central bank has contracted out the day-to-day operation of all or part of the system, for example to an independent facilities management company, it will need to ensure that it can monitor and achieve an adequate level of service. Other Core Principles can involve particular public policy considerations. For example, in determining compliance with Core Principle IX on access, the central bank needs to take into account whether there are any wider consequences for the system that could stem from the participation in such a system of a particular institution, or class of institutions. Compliance with Core Principle VIII on efficiency requires the central bank operator to consider explicitly the needs of participants and users. A central bank will want to take into account the need to foster efficiency and encourage wide participation in a system that lowers systemic risk.

8.2.3 Central banks, as system operators, are likely to have to address Core Principle X, on governance, in different ways from private sector operators because of the multiple and varied roles performed by a central bank and the need to be consistent with the central bank's governance structure which will reflect the range of its roles. See paragraphs 7.10.11-7.10.12 for a discussion of these issues.

Responsibility C - The central bank should oversee compliance with the Core Principles by systems it does not operate and it should have the ability to carry out this oversight.

8.3.1 The designer and operator of a systemically important payment system bear the primary responsibility for ensuring that the system complies with the Core Principles. Where the central bank is not itself the operator, its role is to oversee compliance, ensuring that the designer and operator fulfil their responsibilities. The need for a sound basis for oversight and the varying means by which this can be achieved are discussed in Part 1. The need for clear definition of a central bank's oversight objectives and for public disclosure of its relevant policies is covered by Responsibility A.

8.3.2 A central bank setting up an oversight regime will need to consider how the oversight regime will fit with its existing responsibilities, operational roles and any other interactions with the payment system. It may also need to consider its role as an operator of a systemically important payment system or as a supervisor of banks.

8.3.3 In several countries where the central bank's role as payment systems overseer has been re-examined, there has been a preference to establish it on a formal basis. This depends on the view of relevant parts of government and the legislature. Such an approach can have the advantage of providing the central bank and payments system operators with clarity about objectives and the tools to achieve them. (Box 21 gives examples of countries where oversight has been established on a formal basis.) In other cases the central bank may be able to establish an effective role on the basis of existing roles and powers.

8.3.4 Whatever the basis for the oversight regime, there are a number of steps that need to be taken both at the outset and on an ongoing basis. They include:

- identifying systems that are subject to central bank oversight. This should include all systemically important payment systems which the central bank does not itself operate. Operators and users of the systems should be made aware of the central bank's decision to exercise oversight. Systems which are considered not to be systemically important may need to be re-assessed periodically to assess the relevance of changes in their activities or environment;
- reviewing and evaluating the design and operations of each existing systemically important payment system, to ensure that it meets each of the Core Principles. Overseers may require higher standards than the minima required by the core principles (see Core Principles IV and V) or they may have requirements about matters that are not covered by the Core Principles.
- evaluating proposed new systems at the design stage to minimise the costs of compliance;
- evaluating systemically important payment systems continuously. Overseers should collect information from system operators so that they can keep their evaluations up to date. Changes in the legal, technical or financial environment can have implications for compliance, as can changes to the system's design and operation. The central bank should be notified well in advance of any significant design or operational changes proposed, so that there is adequate opportunity to evaluate them; and
- ensuring that action is taken to remedy any deficiencies in compliance, within a time-scale that is reasonable for the nature of the deficiency and the necessary action.

Box 21

Legislation on payment system oversight

In ***Canada***, the *Payment Clearing and Settlement Act 1996* gives the Bank of Canada formal responsibility for oversight of clearing and settlement systems that could pose systemic risk. The Bank of Canada can require an eligible system or its participants to provide it with any information necessary for its oversight activities. If the Governor of the Bank forms the opinion that the operation of an eligible system has the potential to pose systemic risk, he may designate a system as being subject to ongoing oversight by the Bank under the Act, provided that the Minister of Finance agrees that it is in the public interest to do so. Once designated, a system will have to satisfy the Bank that the system has appropriate mechanisms in place to control systemic risk. Designation also provides greater certainty to the operations of netting arrangements and settlement rules and gives certain protections from legal challenges.

The Bank may enter into agreements with a designated system or its participants regarding the operation of the system, and may conduct audits of any designated system. Designated systems are required to provide the Bank with advance notice of any significant change to be made to the system or its rules. The Governor may issue directives in extreme situations to a system or a participant where he judges systemic risk is inadequately controlled.

In ***Australia***, the *Payment Systems (Regulation) Act 1998* gives the Reserve Bank of Australia regulatory responsibility for efficiency as well as stability of the payments system. The Act allows the Reserve Bank to collect data from payment systems and to designate a payment system as subject to its powers. It may then determine rules for participation in that system, including rules on access for new participants. The Bank may also set standards for safety and efficiency for that system. These may deal with issues such as technical requirements, procedures, performance benchmarks and pricing. The Act provides for the Bank to arbitrate on disputes in that system over matters relating to access, financial safety, competitiveness and systemic risk, if the parties concerned wish it to do so. The Bank has power under the Act to issue directions to payment systems and there is an enforcement regime of fines and other penalties.

In the ***euro area,*** since 1 January 1999, payment system oversight is performed by the Eurosystem.[6] The legal foundation of the function is contained in the *Treaty establishing the European Community* ("Treaty") and in the *Statute of the European System of Central Banks* (ESCB) *and the European Central Bank* (ECB) ("Statute"), where it is established that one of the basic tasks of the Eurosystem is "to promote the smooth operation of payment systems". In addition, Article 22 of the Statute states that "The ECB and national central banks may provide facilities, and the ECB may make regulations, to ensure efficient and sound clearing and payment systems within the Community and with other countries." In line with the provisions of the Treaty and Statute, the Governing Council formulates the common policy stance. In particular, the Governing Council determines the objectives and core principles of a common Eurosystem oversight policy in those cases where the functioning of payment systems may affect: (i) the implementation of monetary policy; (ii) systemic stability; (iii) the establishment of a level playing-field between market participants; and (iv) cross-border payments within the EU and with other countries. In line with the principle of subsidiarity, in areas not specifically covered by the common oversight policy, policies defined at the NCB level apply within the framework of the objectives and core principles defined at the Eurosystem level, in relation to which the Governing Council can always take an initiative, where necessary. In line with the principle of decentralisation, enforcement of the common oversight policy stance is usually entrusted to the NCB of the country where the system is located. It can be ensured by different legal means (eg legal instruments available to an NCB, ECB regulations or guidelines) or more informal tools (eg moral suasion).

In ***Italy***, *article 146 of the 1993 Banking Law*, in line with article 22 of the ESCB and ECB Statute, assigns the Banca d'Italia the task of overseeing the payment system, giving it the power to "issue regulations to ensure the efficiency and safety of clearing and payment systems". Because of this general formulation in the law, oversight in Italy is able to cover payment instruments and services, technological infrastructure, interbank exchange procedures, and funds transfer systems. This legal framework means that, as well as its more traditional means of promoting cooperation among intermediaries by moral suasion, the Banca d'Italia also performs oversight through the exercise of regulatory powers. It does this in accordance with general rules established by law and with the principle of competition. In order to disclose more explicitly its objectives, role and major policies in the field of payment systems, the Banca d'Italia published two White Papers in 1995 and 1999.

[6] The Eurosystem comprises the ECB and the national central banks (NCBs) of the Member States which have adopted the

8.3.5 The tools that central banks can use in undertaking oversight fall into three general categories: collecting information, analysing the information, and taking action in response. (Some of the tools currently used by different central banks are briefly described in Box 22.)

8.3.6 The Core Principles give comprehensive guidance on the practices that overseers should encourage. Occasions may arise when operators and users are reluctant or slow to implement required reforms and central banks will have to consider the means to achieve its objectives. The particular means will depend in large part on the basis of the central bank's oversight regime.

8.3.7 Formal legislation may specify enforcement powers such as fines, cease and desist orders, and other civil and perhaps criminal penalties. Some central banks value having a range of penalties or remedies, as the threat of a clearly excessive penalty (such as closure of the system) may not be credible. In less formal regimes, the central bank may need to use other techniques, such as moral suasion or varying the terms on which settlement accounts are conducted, to encourage compliance with its oversight requirements.

8.3.8 Payment system oversight requires varied skills in specialised areas including the management of financial, legal and operational risk, as well as the skills necessary to ensure that the oversight process includes an appropriate application of the results of the risk analysis. Overseers therefore need to ensure that they are able to draw together the services of staff who have the relevant expertise. Relevant areas of expertise include economics, banking, finance, information technology and law. Some central banks achieve this by identifying individuals with responsibility for oversight who co-ordinate contributions from other departments. An increasing number are establishing a specialist department directed to payments system oversight. Information exchange and cooperation between payment system overseers is a fruitful way of helping to ensure effective oversight.

euro in Stage Three of Economic and Monetary Union. The Eurosystem is governed by the decision-making bodies of the ECB, which are the Governing Council and the Executive Board.

Box 22

Oversight tools

Gathering information

- Collecting written information (financial reports, statistics, rules and procedures, minutes of governing bodies, etc.) from sources provided by payment system operators.
- Collecting information through discussions with relevant parties (operators, internal and external auditors, participants, etc.).
- Collecting information by inspecting and testing physical systems of the payment systems.
- An overseer's information-gathering can be supported by specific formal powers.

Analysing information

- Identifying systemically important payment systems.
- Reviewing the design and operation of all systemically important payment systems using the Core Principles and other relevant payment system materials (such as those found at the BIS website at www.bis.org).
- Reviewing analyses conducted by other relevant bodies (internal and external auditors; risk management division in the payment systems; and authorities conducting independent assessment, such as IMF and the World Bank).

Taking action

- Presenting speeches and publications.
- Persuading payment system operators to make changes to rules and procedures.
- Making the provision of central bank settlement services dependent on the certain conditions.
- Establishing formal agreements with payment system operators.
- Actions in accordance with specific formal powers, such as issuing cease and desist orders, directing a change to rules and procedures, or exacting financial penalties.

Responsibility D - The central bank, in promoting payment system safety and efficiency through the Core Principles, should cooperate with other central banks and with any other relevant domestic or foreign authorities.

8.4.1 Several types of domestic authorities which can have an interest in the safe and efficient functioning of payment systems are listed in Part 1. Mutual cooperation is likely to assist the central bank (whether in its capacity as overseer and/or as operator of systemically important payment systems) and each of these authorities in achieving their respective policy goals. The basis for cooperation can vary in its degree of formality. For example, in some countries the central bank has signed a memorandum of understanding with other authorities. This has the advantage of clarifying the respective roles of the authorities, in order to facilitate the exercise of their responsibilities both in normal circumstances and in the effective handling of any crises.

8.4.2 The relationship between payments system oversight, the supervision of financial institutions and the surveillance of financial markets is particularly important. In some cases more than one of these functions is carried out within the central bank; in others, separate authorities are involved. Box 23 explains the differences between these activities. Well-designed payment systems can reduce the risk that instability in one financial institution is transmitted to another through participants' inability to settle in the payment system, leading to disruptions in the operation of financial markets. At the same time, prudent risk management by individual financial institutions can reduce the risk of such occurrences and reduce pressures on the payment system. Complementary oversight, supervision and surveillance policies can thus make the task of each responsible authority easier and contribute to greater financial stability. The establishment of protocols for the exchange of relevant information (regularly, optionally and exceptionally) between overseers, supervisors and surveillance authorities can be a valuable tool for the practical exercise of such cooperation.

Box 23

Three activities by public sector agencies which contribute to financial stability: supervision, surveillance and oversight

The task of safeguarding financial stability by regulation of the financial system commonly comprises three distinct components (the distinction is emphasised by the use of different English words): supervision of financial institutions, surveillance of financial markets and oversight of payment and settlement systems. These three component functions are, in some countries, all the responsibility of the central bank, but, in others, the functions are distributed among more than one agency. It is important to recognise that the three functions are complementary. The ***supervision*** of financial institutions is usually a clearly defined task with a mandate in law. The institutions supervised usually include participants in systemically important payment systems;

The ***surveillance*** of financial markets tends to be more loosely defined. It can include both the monitoring of market developments and the regulation of some aspects of market activity by setting and enforcing rules and standards governing the structure of markets and the behaviour of the parties involved. One important purpose is to ensure efficiency, transparency and fairness in financial markets and to anticipate or prevent financial shocks. Payments made to settle financial market transactions are frequently settled in systemically important payment systems and participants in those systems are frequently also active in financial markets; and

The ***oversight*** of payment (and settlement) systems focuses on the stability and efficiency of the systems as a whole, as opposed to the stability or efficiency of individual participants or of the financial markets that the systems serve. This report identifies the safety and efficiency of systemically important payment systems as objectives of public policy and describes the responsibilities of central banks in this area. Responsibilities B and C deal with compliance by all such systems with the ten Core Principles identified in the report as a means of furthering the objectives of safety and efficiency. Responsibility C is concerned with central bank oversight of systems that are privately owned or operated.

8.4.3 Developments in foreign payment systems could have a significant impact on domestic systems, especially, for example, if a large participant operating in both were to experience liquidity or solvency problems. Central banks as operators and/or overseers of systemically important payment systems therefore need to understand the implications of the design and operation of foreign payment

systems for their domestic systems. This requires cooperation with other central banks and sometimes other foreign regulatory authorities.

8.4.4 Payment systems with cross-border features may require particularly close cooperative oversight. The "Lamfalussy Principles for Co-operative Central Bank Oversight of Cross-border and Multi-currency Netting and Settlement Schemes" provide a framework for cooperative oversight of such systems. This is summarised in Box 24. An example of cooperative oversight is the European Central Bank's (ECB) oversight of the Euro 1 system. The ECB regularly discusses developments in the management of the system with other central banks of the euro area. It also shares information with the home central bank of non-EU banks that participate in Euro 1 through their EU branches.

Box 24

Lamfalussy principles for cooperative central bank oversight of cross-border and multi-currency netting and settlement schemes

Part D of the Report of the Committee on Interbank Netting Schemes (Lamfalussy Report) sets out a framework for cooperation among central banks in overseeing cross-border and multi-currency netting schemes. The main principles for such oversight are:

- Each central bank that has identified the actual or proposed operation of a cross-border or multi-currency netting or settlement system, outside the country of issue of the relevant currency or currencies, should inform other central banks that may have an interest in the prudent design and management of the system.
- Cross-border and multi-currency netting and settlement systems should be subject to oversight by a central bank which accepts primary responsibility for such oversight and there should be a presumption that the host-country central bank will have this primary responsibility.
- In its oversight of a system, the authority with primary responsibility should review the design and operation of the system as a whole and consult with other relevant authorities on its conclusions both in the first instance and, from time to time, with respect to developments in the system's status.
- The determination of the adequacy of a system's settlement and failure-to-settle procedures should be the joint responsibility of the central bank of issue and the authority with primary responsibility for the system.
- In the absence of confidence in the soundness of the design or management of any cross-border or multi-currency netting or settlement system, a central bank should discourage the use of the system by institutions subject to its authority and, if necessary, identify the use of, or the provisions of services to, such a system as constituting an unsafe and unsound banking practice.

Section 9: Special situations in applying the Core Principles

9.1 Cheque Clearing and Settlement Systems[7]

9.1.1 Cheques have a long and varied history and are one of the oldest non-cash payment instruments. In many countries this has led to a large body of law covering these instruments, often reflecting varying practices and experiences. Cheque systems have recently become much more efficient in a number of countries, with the use of electronic presentment, truncation and telecommunications. But cheque systems raise particular issues in applying the Core Principles, which are examined in this section.

9.1.2 In general, a cheque is a written order from the drawer (payor) to his bank (paying bank), to pay a sum of money to a third party (the payee). When a cheque is delivered to a payee, the payee typically deposits the cheque in his bank (the collecting bank) for collection. When cheques are drawn on one bank and deposited for collection with another, an interbank clearing and settlement process is necessary to effect the transfer of money from the payor to the payee. Countries differ with respect to the interbank clearing and settlement systems and other arrangements used for collecting cheques. Clearing houses are widely used. In some countries, central banks operate cheque clearing systems. (Banks also sometimes present cheques directly to one another or use correspondent banking arrangements.) Cheques are frequently presented to the payor bank in groups or batches, sometimes called "cash letters". Interbank settlements for clearing houses and central bank clearing systems typically are conducted on the books of a central bank. Settlement can take place on a gross or net basis, depending on the country and the system.

9.1.3 The paying institution may refuse to pay (ie may dishonour) a cheque presented to it, if the drawer has insufficient funds to cover the cheque, if the cheque is fraudulent or the cheque is otherwise invalid. In such instances, entries passed to a payee's account would be reversed. The timing of the dishonour process varies considerably between countries. In some, it occurs prior to final interbank settlement, while in others it may not be completed until several days later.

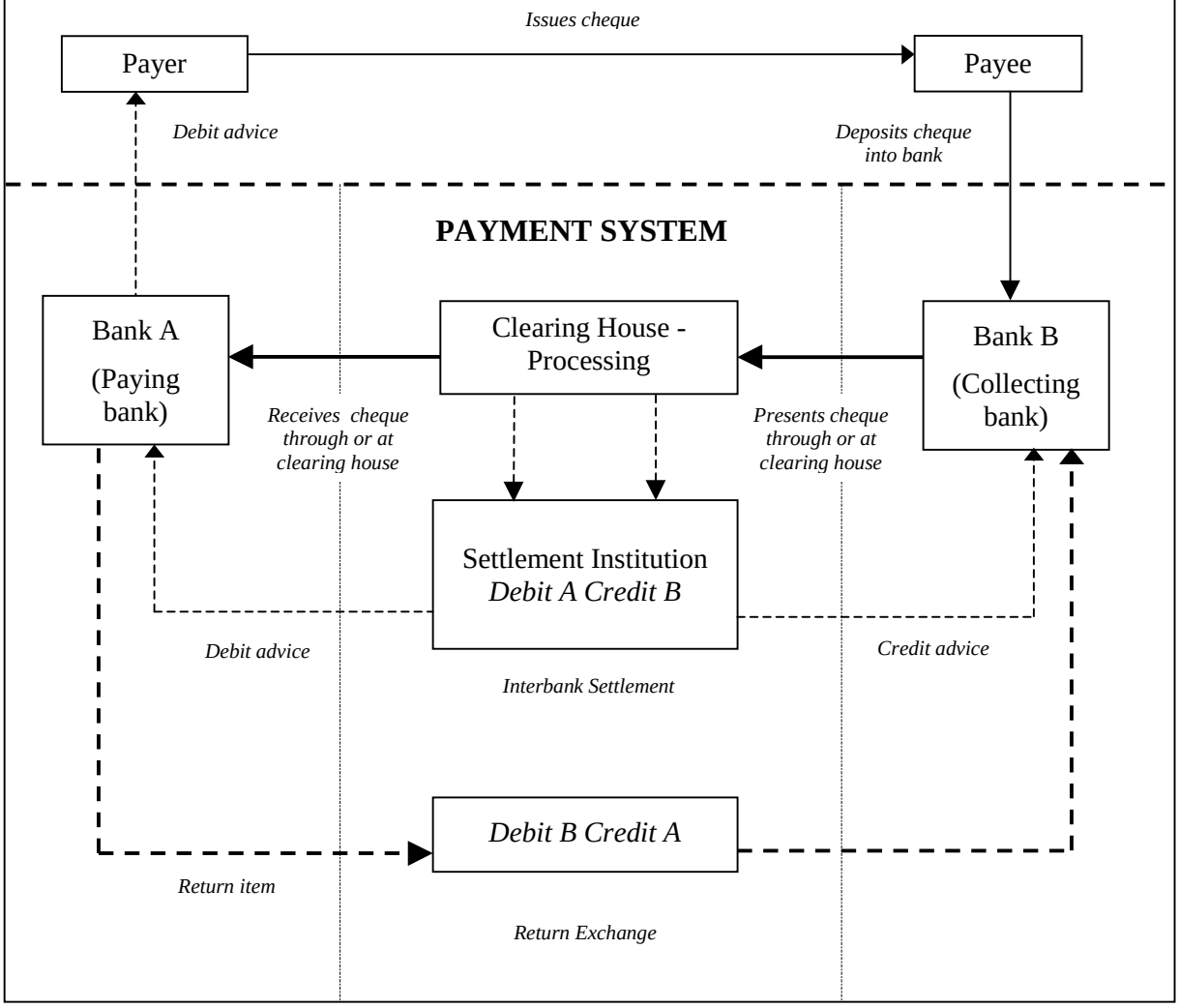
9.1.4 Box 21 is a stylised depiction of the collection of a cheque through a clearing house arrangement. Many cheque clearing houses have a similar structure. There are many variations, however, and in some countries the functions of a clearing house can go well beyond those indicated in the diagram.

9.1.5 Traditionally, cheques have been exchanged physically between the paying and collecting banks. New clearing processes such as electronic cheque presentment, cheque truncation and digital imaging can eliminate physical presentation and speed up the clearing and settlement, including the return of dishonoured cheques.

[7] Other issues related to cheques and to cheque clearing and settlement systems in the G10 countries and Australia are discussed in the report *Retail Payments in selected countries – a comparative study, BIS, September 1999* and *Clearing and Settlement arrangements of retail payments in selected countries*, (forthcoming BIS/CPSS report).

Box 25

Stylised life cycle of a cheque transaction



Risks in cheques and in cheque clearing and settlement systems

9.1.6 Much discussion of cheques focuses on the issues associated with ***individual cheques*** and the problems they raise for end users and their banks because of the possibility that cheques deposited may subsequently be dishonoured. It is important to distinguish these issues from those that arise ***in cheque clearing and settlement systems*** in which banks participate. The key credit and liquidity risks involved with individual cheques and cheque clearing and settlement systems are summarised in the table below. The different issues raised both by individual cheques and by cheque clearing and settlement systems are discussed in the following paragraphs.

Risks in cheques and cheque clearing and settlement systems

	Individual cheque	**Cheque clearing and settlement system**
Credit risks	• Risk to the beneficiary that the cheque will be dishonoured. • Risk to the bank from its policies on when it makes funds available to customers depositing cheques.	• Risk to the collecting bank that the paying bank will be unable to settle. This risk is of the same nature as in any other payment system, but in the case of cheques it can be difficult or costly to limit the credit exposure of participants to one another.
Liquidity risks and liquidity management	• Payee may face liquidity risk if the cheque is dishonoured. • An individual cheque is relevant only to the total of the paying bank's settlement obligations.	• Banks settling obligations in cheque clearing and settlement systems face liquidity risks if obligations cannot be settled when expected. Similar risks arise in other payment systems, but in the case of cheques it can be difficult or costly to limit or accurately predict their net settlement obligations.

Individual cheques

9.1.7 The credit and liquidity risk issues raised by individual cheques, summarised in the first column above, do not typically raise systemic risk concerns. The allocation of risk is usually a commercial matter between banks, their customers and issuers of cheques. In some countries, government regulations or industry conventions regarding the timing of the availability of funds to persons that deposit cheques for collection may affect the credit exposures of banks to their customers. The risk exposures of banks resulting from the collection of individual cheques and from commercial relationships between banks and their individual customers is not the focus of the assessment of whether a cheque clearing and settlement system complies with the Core Principles.

9.1.8 The use of a cheque to make payment involves an inherent credit risk, but that risk is not necessarily transferred to the financial institutions that clear and settle cheques. When a payee accepts a cheque in payment of an obligation by a payor, the settlement of the cheque is subject to two credit risks: (1) that the payor, the drawer of the cheque, will not have sufficient funds to cover the cheque and that his bank will not pay (will dishonour) the cheque; and (2) that the bank on which the cheque is drawn will not have sufficient funds to settle for the cheque. The first risk reflects a key features of the cheque as a "debit transfer" instrument that can be created before the drawer's bank has an opportunity to determine whether the drawer has sufficient funds to cover the cheque. The second risk reflects a feature of all payment systems that involve interbank settlement, where the payment instrument is created in advance.

9.1.9 Typically, the collecting bank will post a conditional credit to the payee's or other depositor's account on deposit of the cheque. In some countries, funds are made available to the depositor of a cheque only when the period for dishonour and return of the cheque has expired.[8] In other countries, funds are made available according to government regulations or industry conventions. The credit risk is transferred to the collecting bank only if the bank provides credit to the depositor before the period for dishonour and return of the cheque has expired. This risk, however, is a matter that is determined by the bank and its customer, or in some cases by public policy, but it is not typically treated as an interbank risk with possible systemic implications.

9.1.10 Liquidity risks at the level of individual cheques occur when payees or other depositors rely on the proceeds of cheque deposits and the funds are not made available at the specified time. These risks, however, do not impact the cheque clearing system, but rather the individual customer's business. When cheques are used to settle large financial market transactions or obligations from other payment and settlement systems, however, the dishonour of one or a few cheques as a result of the difficulties of a particular financial institution can cause disruptions in markets or payment and settlement systems.

Cheque clearing and settlement systems

9.1.11 Cheque clearing and settlement systems are a form of deferred settlement system, often settling on a multilateral net basis, for debit transfers, typically with few or no risk controls. Settling banks for such a cheque system face significant liquidity management problems and in some cases credit exposures that cannot be predicted or limited as easily as they can in a credit-based system.

9.1.12 One key difference between cheques drawn by banks' customers and other payment instruments is that cheques can be issued by a payor without any prior notice to the paying bank. An individual with a valid account and sufficient funds can withdraw those funds by issuing cheques for any amount at any time without notifying his bank. The payor's bank is therefore faced with a settlement obligation which it cannot limit and which it cannot easily and fully predict. The payor's bank can use historical statistical data to monitor its likely obligations, but this is an ex post risk measure and is not likely to be helpful in conditions of market stress. Depending on the terms of deposit contracts, banks could, of course, ask customers to provide them with prior notice that they will be writing large-value cheques.

9.1.13 Although banks participating in the settlement of cheque clearing systems face the same types of interbank settlement risks as banks participating in any other system with similar deferred net or gross settlement characteristics (including those processing credit transfers), there is not normally any practical way for banks to limit their settlement exposure in cheque systems to other participating banks. Indeed, banks do not usually set or implement limits on settlement exposures in cheque systems. The use of limits in these systems could, among other things, interfere with the execution of commercial claims and conflict with an efficient and speedy processing and settlement of cheques received from each bank's customers. In contrast, in credit transfer systems, particularly those with real time processing capabilities, limits are typically set, such as net sender debit caps or other risk controls are established that limit the credit and liquidity exposures of participants in the settlement system or credit providers such as central banks.

9.1.14 Assessment of compliance with the Core Principles therefore needs to focus on the particular liquidity management problems and credit risks faced by banks participating in cheque clearing and settlement systems.

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[8] In many cheque systems, a higher level of financial risk for end users exists because of the time allowed for returns. The longer this period, the more risk there is that a default or fraud could occur for the financial intermediaries or the payor.

Specialised systems based on bank cheques

9.1.15 Some specialized systems for payment of interbank obligations when banks act as principals – such as those involved in money market transactions – use cheques drawn by banks on themselves. These are variously known as bank cheques or cashiers' cheques and in some countries special instruments known as drawing vouchers or warrants are used for the same purpose.

9.1.16 Systems using such cheques have different characteristics from those which settle customers' cheques. Banks issuing bank cheques know the amounts for which they have issued them and when they are likely to be presented. Banks can thus predict with some confidence the amounts they will be due to pay at settlement and if necessary can limit their prospective obligations by limiting the issue of such cheques. They will, however, have no direct prior warning of the amounts to be paid to them in net settlement systems and thus of their net settlement obligations. Nevertheless, banks participating in such systems have more scope than in normal cheque systems to predict and control their settlement obligations and thus their liquidity needs.

9.1.17 Banks participating in such cheque clearing systems are exposed to a liquidity and possibly credit risk that a participant in the system will be unable to meet its settlement obligations. This risk however, arises because of the lag between the exchange of the bank cheques and the subsequent settlement of the net obligations. This risk is also present in systems in which banks exchange credit transfer instructions but in which settlement is deferred. The risk thus reflects the delay between the exchange of cheques (which is the acceptance of the payment by the system for settlement) and settlement, and not the nature of the instrument exchanged.

How difficult is it for cheque systems to comply with the Core Principles?

9.1.18 To determine whether a particular cheque clearing and settlement system meets the Core Principles requires careful analysis of the specific case, because laws, regulations and organisation vary from country to country.

9.1.19 Some Core Principles can be met by these systems with no more difficulties than by any other payment systems, but the key characteristics of cheque clearing and settlement systems mean that they face particular difficulties in meeting Core Principles III, IV, V and VIII. Systemic risks can be exacerbated when key clearing and settlement activity is concentrated on a single cheque clearing system, particularly when such a system takes on functions beyond the mere exchange of cheques and administration of settlements. In some countries cheque clearing systems can take on much wider functions, including providing key rules for clearing and settlement, organising cheque processing and transportation, and providing for settlement guarantees. In effect, a system can be the only practical means of interbank collection for cheques, which in turn might be the key payment instrument in an economy. If such a system ceases to function effectively, then the payment system of the country will face serious disruption.

- Core Principle III: This Core Principle deals with defining the procedures for the management of credit risk and liquidity risk. It is doubtful whether it could be met at all times. It is normally only with great difficulty, particularly in systems where the processing is paper-based, that the paying bank can measure its expected settlement obligations and thus the size of its liquidity management task, particularly in systems settling large values, in such a way that it has more than a very short time between the collection of cheques and their interbank settlement to cover its obligations. Limits, for instance on the size of cheques being issued, could be set in the system in an attempt to contain this risk. This could, however, conflict with the bank-customer relationship and might not be commercially practical.
- Core Principle IV: This Core Principle calls for prompt final settlement. In a cheque clearing system, adequate arrangements (collection of cheques, fast processing, rapid communications etc) could allow participants to be aware of their settlement obligations early enough to fund them and complete interbank final settlement in due time. This may be difficult to achieve in a large country, especially one with many time zones, without

extensive and costly investment in electronic processing. A further conflict could exist between the need for prompt settlement, the reduction in time available for liquidity risk management that this might cause in some systems, and the cost of the risk management mechanisms needed to comply with Core Principles III and V.

- Core Principle V: This Core Principle deals with the completion of timely settlement by a multilateral netting system, if the participant with the largest net debt fails to settle. The problem for cheque systems is that it is difficult to place a limit on the maximum settlement obligation of participants. Indeed, few cheque systems have arrangements to ensure that settlement is completed. Some systems appear to rely on the prospect of unwinding settlement positions or individual payments in the case of a settlement failure as a means to settle payments other than those involving a defaulting participant. This might not be a major issue for systems that are not systemically important, but it is essential for systemically important systems. One way of addressing this issue would be to set up a guarantee fund, funded by the system's participants. The difficulty of meeting Core Principle V lies again with the unpredictable settlement obligation of the paying bank. Any settlement guarantee fund attempting to address the default of a participant would have to be capable of being adjusted promptly to meet the unexpected variations due to large cheques being issued and presented. Moreover, this adjustment would have to be done in the short time between the calculation of the net obligations and their settlement. The longer the delay, the more time the paying bank has to manage its exposure. The shorter the delay, the more demanding it is on of the organisation of the system and on the banks' management of available funds.

- Core Principle VIII: This Core Principle states that the system should provide a means of making payments that is practical to its users, and efficient for the economy. Assessing a cheque system against Core Principle VIII could show that, in many cases, cheques are considered practical for the users, which would explain their general availability throughout the world. The cost, however, of developing and operating a systemically important cheque system so that it meets all of the Core Principles is likely to be high and might prevent compliance with Core Principle VIII. Risk control measures such as a settlement fund or restrictions on cheque issuance and use might make it too costly for users.

9.1.20 In cases where a cheque system is the only non-cash payment system, and thus is likely to be systemically important because of the value and importance of the transactions processed, there are two alternative approaches to ensuring compliance with the Core Principles:

(1) replace the entire cheque system with a credit transfer system; or

(2) channel all large value payments through a separate credit transfer system.

9.1.21 The first alternative in most cases will be impractical, because of the difficulty for users in moving away from a familiar and, for most of them, well-functioning system. The second alternative has been adopted in many countries, as, typically, a very small proportion of the number of cheque payments make up the bulk of the high value in a combined system. Therefore the new credit transfer system will not necessarily need to support a high volume of payments, and appropriate risk measures can be taken which are consistent with the Core Principles.

9.2 Cross-border aspects of payment systems

9.2.1 Payment systems can involve a wide variety of cross-border aspects. At one extreme, a system can include sophisticated arrangements for making cross-border payments, involving operations in multiple currencies and participants in several jurisdictions. Further down the scale, payment systems can include facilities for remote access by participants located in countries or jurisdictions other than the system's own, or, more simply, a system can have participants that are either foreign-owned domestic institutions or the local branches of foreign institutions. The issues that such cross-border aspects raise become increasingly important as the scale of cross-border activity grows. For example, the worldwide trend towards greater financial integration, tends to mean that correspondent arrangements are used less and that there is increasing demand for payment systems

that allow payments to be exchanged and settled directly among participants located in more than one country or jurisdiction.

9.22 There are a few prominent examples of large-scale payment systems operating in more than one jurisdiction. For example, the TARGET system of the European System of Central Banks and the payment system of BCEAO for the West African Monetary Union process and settle payments in a single currency within a monetary union. There are also several examples of systems that process payments in more than one currency. Payment systems with more limited cross-border aspects are relatively common.

9.2.3 The following paragraphs draw attention briefly to some of the main issues that arise in complying with the Core Principles or in overseeing compliance where a system has cross-border aspects. These are not, for the most part, wholly different from issues that arise for purely domestic systems, but cross-border aspects can add to their importance or complexity.

Complying with the Core Principles

9.2.4 Compliance with Core Principle I, in particular, can be considerably more complex where a system has cross-border aspects. In order to establish whether a system has a well-founded legal basis, it is necessary to assess not only whether the arrangement is legally robust in its domestic legal environment but also to identify possible conflicts between the relevant laws of the domestic jurisdiction and laws of other relevant jurisdictions. In determining which jurisdictions are relevant, a range of possible circumstances needs to be taken into account. As well as the jurisdiction whose laws govern the system itself, any other jurisdiction is relevant if its laws govern participants, for example participants located or licensed in other countries, whether they have a local presence (for example a branch) or whether they access the system remotely. Insolvency laws are likely to be particularly important, but the laws governing collateral arrangements (see Box 2), settlement finality, or dispute resolution can also be relevant.

9.2.5 Cross-border netting is a particular example of an arrangement that can give rise to complex legal issues. A system engages in such cross-border netting if it settles payments on a net basis and if not all of its participants are incorporated or carrying on business in the same jurisdiction. Determining whether a particular case of cross-border netting is legally well-founded requires an examination of any law that could be relevant to the arrangement itself, to any central counterparty involved in the netting, or to the involvement of any of the system's participants (their head offices and relevant branches), particularly in the event of a participant's insolvency. The detailed arrangements for any system involving cross-border netting would need to be examined, for example by obtaining legal opinions. It would not normally be sufficient to rely on opinions expressed in more general terms. In several countries, there has been recent legislation that can be expected to simplify such assessments and to improve the reliability of their conclusions. For example, there are current programmes of legislation to ensure the enforceability of netting under all jurisdictions of the European states belonging to the European Economic Area. The centrepiece of this programme is the Settlement Finality Directive, which was adopted in May 1999 (see Box 3 for a discussion of the directive).

9.2.6 Issues involved in complying with certain of the other Core Principles can also be more complex where a system has cross-border aspects. For example, a multi-currency system requires careful consideration of the risks associated with the settlement assets in relation to compliance with Core Principle VI. See paragraph 7.6.6 for a discussion of systems that settle in claims on a central bank in a currency which that central bank does not itself issue.

9.2.7 For systems with significant cross-border aspects, the issue can arise of whether to establish more demanding standards for participation than domestic systems. For example, there might be a case for restricting eligibility to participate in the system in such a way as to ensure compatibility of legal jurisdictions, a comparable ability to bear and manage risks, or the ability of all participants to comply with technical standards. In order for the system to comply with Core Principle IX, it is important that any such requirements are proportionate to the risks involved and are reasonable, fair and publicly disclosed. See paragraph 7.9.6 for a general consideration of how to approach the trade-off between open access and risk and/or efficiency.

Overseeing compliance with the Core Principles

9.2.8 Systemically important payment systems with significant cross-border aspects can affect financial stability in more than one country. In the worst case, a problem in such a system could transmit disturbances to others. For this reason, close cooperation among all relevant overseers and supervisors of the parties involved is desirable in such cases. (This is discussed in paragraph 8.4.4.)

Section 10: The use of the Core Principles

Using the Core Principles as part of payment system review or reform

10.1 In an economy with a well-developed payments infrastructure, the central bank should use the Core Principles to carry out an initial assessment of the system or systems identified as being systemically important. Such an assessment should include both existing systems and any systems that are being planned or developed. Clear deadlines should generally be set for a system to comply with any of the Core Principles where it currently falls short. Assessments should be carried out at regular intervals thereafter, so that the central bank (as operator or overseer) can monitor continued compliance or progress towards fulfilling those Core Principles which were not met initially.

10.2 In an economy where the payments infrastructure is poorly developed or where it is not functioning effectively, implementation of the Core Principles might well be considered in the context of planning and effecting a more comprehensive payment systems reform or development programme. (Some of the issues involved in such a process are discussed in paragraphs 10.11-10.14 below.) A comprehensive reform programme should enable systemically important systems to be built or redesigned in a way that would meet the Core Principles in full at the outset.

10.3 The way that a particular system is used can change over time and could cause it to become or to cease to be systemically important. The central bank should continue to assess regularly whether a particular system should be required to comply with the Core Principles. The central bank should also be aware of developments or perhaps longer-term trends in the local economy (for example, developments in the skill base or in available technology) that could be relevant to the choice of system design and the means by which the system could best comply with particular Core Principles, for example Core Principles VII and VIII.

The effect of payment system design and organisation on implementation of the Core Principles

10.4 The design and organisational features of a particular payment system will influence the application of the Core Principles. For example, Core Principle V would, by definition, not apply to real-time gross settlement systems but would apply to deferred net settlement systems and probably to some hybrid systems, whereas Core Principle IV would apply to all three types of systems. Similarly, different ownership structures affect the interpretation of Core Principle X. The type of technology employed by the system also affects the application of some of the Core Principles. For example, the ways to ensure operational reliability in accordance with Core Principle VII is significantly different for manual and electronic methods of processing payments.

Institutional roles and organisational issues

10.5 The central bank has a key role in any programme of payment system assessment and reform. Central banks bear responsibility for ensuring that systemically important payment systems comply with the Core Principles set out in this report, either a primary responsibility as system operator or a secondary responsibility as payment system overseers. Other authorities, however, can also help to ensure safe and efficient payment systems. For example, the cooperation of Finance and Justice ministries, together with the legislature, can be required in the implementation of any legal reforms related to payment systems that are undertaken in the interests of achieving compliance with the Core Principles or as part of a large-scale payment system reform or development initiative.

10.6 Commercial banks and any other financial institutions which participate in payment systems, should also be closely involved in this process. Where the banking sector is not as yet sufficiently well-established or does not have the necessary resources to make an effective contribution, the central bank may need to take on more of the detailed responsibility for implementation.

10.7 Whatever the precise balance between central bank and commercial bank involvement, it can be helpful to establish a consultative forum to co-ordinate payment system reform. The forum can

include relevant user groups and interested bodies, in order to represent different interests and different areas of expertise (technical, legal, and institutional). Such a body can be helpful in building support within the financial sector for an appropriate long-term payment system strategy, in promoting it to the wider public, and in securing the necessary mobilisation of resources from the various groups to meet the objectives. A consultative forum can have an important role in relation to the design and operation of an individual system, particularly if the system is not owned by its participants and operated on their behalf, for example if the owner and operator is the central bank – see paragraphs 7.10.11-7.10.12. Its role could include risk analysis and determining a programme to achieve compliance with the Core Principles, including setting its priorities and its timetable. Such a forum can also be useful when a more comprehensive programme of payment system reform in a country is being developed and carried through.

Major programmes of payment systems reform or development – payment systems and the markets they serve

10.8 When the central bank is concerned with a major payment system reform or development programme, its first step should be a 'stock-take' of the economy's current payment requirements and the ways in which these are likely to change in the future. A wide range of structural, technical and institutional factors need to be considered, including the structure of the economy and the degree to which the existing payment systems are able to meet the needs of the various markets and users. It is necessary to consider not only current requirements but also the best available forecasts of how the economy, its markets and supporting infrastructure are likely to develop.

10.9 This assessment should cover such basic factors as the volumes and values processed by the existing payment systems, the geography and the distribution of economic areas and financial markets within the country; the size and state of development of different economic sectors, the legal environment and the state of the national telecommunications and other physical infrastructure. On the institutional side, areas to be covered in this exercise include:

- the structure and organisation of the banking sector, as the banks have a pivotal position as providers of payment services and as users of the payments infrastructure. The role, if any, of the postal services or other non-bank institutions in providing payment services should also be considered in this context;
- the clearing and settlement arrangements for the various financial markets and exchanges, and how they link into the payments infrastructure;
- the legal environment, and the implications of this for the rules and other contracts that underpin the payment systems. The basis for the central bank's payment systems oversight should also be considered;
- the framework of monetary policy, and in particular the central bank's arrangements for market operations.

10.10 When this 'stock-take' is completed, it will reveal strengths and weaknesses or gaps in the existing payments infrastructure. This is the necessary factual base on which to build a long-term objective or 'vision' for the economy's payment systems that would meet likely future business needs and enable key public policy objectives to be met.

Implementation issues for major programmes

10.11 The development of an achievable long-term vision is likely to involve agreement on where to strike a number of 'trade-offs'. Certain elements of user 'wish lists' may be incompatible with each other, or with other factors identified in the 'stocktake'. Choices therefore have to be made and explained – perhaps through a published strategic plan.

10.12 The process of realising the long-term objective involves a series of separate projects and initiatives. Some of these will involve the building and/or enhancement of particular payment systems,

but there are likely to be others which focus on aspects of the environment within which the payment systems function. The active cooperation of institutions not directly involved in payment systems (see paragraph 10.5) may well be required. For example, compliance with Core Principle I could require the establishment of a legal framework that would be more supportive of the payment systems by making the impact of insolvency law more predictable or by ensuring consistency between payment system rules and insolvency law. Similarly, improvements in the national telecommunications and IT infrastructure may also be necessary for a successful nation-wide electronic funds transfer system. There may also be a need for changes in the way that the central bank operates – for example to its account (including settlement account) structure and administration.

10.13 Strong project management is usually one of the main keys to success in implementing major programmes of reform. Each individual project needs to be managed actively and specified and documented clearly throughout its life, from a statement of user requirements to a detailed technical specification. Some of the projects are likely to have a higher priority than others, some may need to proceed simultaneously, and some may not be able to begin until others have been completed or have reached a particular stage. An overall business plan is therefore needed, that clearly identifies the priorities and interdependencies of the various projects, sets them in the context of an agreed timetable and budget for the achievement of the long-term objective, and incorporates a mechanism for monitoring the progress of each project against that timetable and budget.

10.14 One important issue in developing and implementing an appropriate long-term objective and business plan is the level of technological support that the economy can sustain. Payment system development can be helped by new technology, but the level of technology should never drive the strategy. There should not be a presumption that a successful large-scale reform or development strategy will always require the adoption of a high level of technology. Instead, technology should be adopted that fits the business needs of the potential users of the system, subject to the budget and infrastructure constraints that are likely to apply over the course of the reform. For example, if certain technology is expensive and difficult to support reliably in a particular case, it might be appropriate to pursue a less capital-intensive solution, perhaps with a timetable for subsequent review.

Annex

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