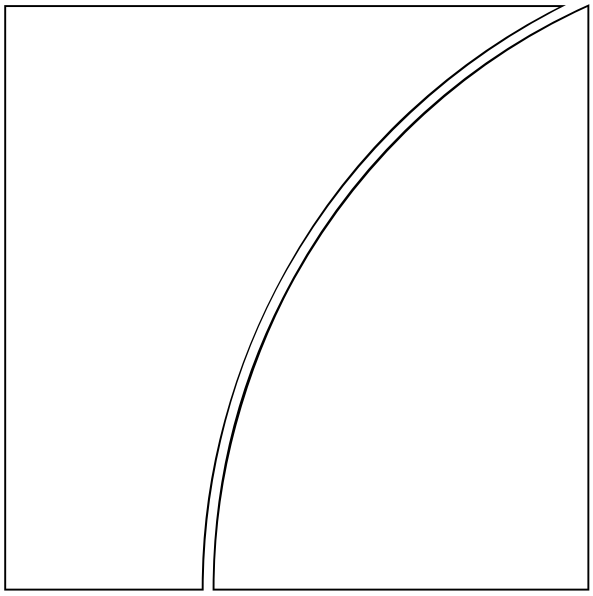
Committee on Payment and Settlement Systems



Core Principles for Systemically Important Payment Systems

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Foreword

There are a number of international initiatives under way to maintain financial stability by strengthening financial infrastructure. The Committee on Payment and Settlement Systems (CPSS) of the central banks of the Group of Ten countries is contributing to this process through its work on developing core principles for systemically important payment systems.

The CPSS established a Task Force on Payment System Principles and Practices in May 1998 to consider what principles should govern the design and operation of payment systems in all countries. The Task Force has developed an international consensus on such principles. It comprised representatives not only from the G10 central banks and the European Central Bank, but also from 11 other national central banks of countries in different stages of economic development from all over the world and representatives from the International Monetary Fund and the World Bank. In developing universal principles, it consulted groups of central banks in Africa, the Americas, Asia, the Pacific rim and Europe.

In December 1999 the Bank for International Settlements (BIS) published a draft of the Core Principles for comment from the wider financial community. From the responses it was clear that there is strong and widespread international support for the Core Principles. It was also clear from both the written and oral comments that many readers would value more detail on how to interpret and implement the Core Principles. Accordingly, the Task Force developed a second part of this report, which provides such guidance. Public comments were sought once again on a draft of the second part and the responses demonstrated continuing extensive support for the exercise and its results.

The Core Principles are expressed deliberately in a general way to help ensure that they can be useful in all countries and that they will be durable. They do not represent a blueprint for the design or operation of any individual system, but suggest the key characteristics that all systemically important payment systems should satisfy. The second part of the report therefore discusses in more depth the interpretation of the Core Principles, by giving more detailed examples of issues to be addressed in complying with the Core Principles and of ways in which these issues have been tackled in some particular contexts. It does not and cannot provide a single model for every practical application of the Core Principles. It is already apparent that both the Core Principles and the explanatory second part of the report are being used widely to analyse payment systems and to guide oversight and reform. That was the purpose of the exercise; I hope the report will continue to prove helpful for many years to come.

The CPSS is grateful to the members of the Task Force and its Chairman, John Trundle of the Bank of England, for their hard work in preparing this report and to the CPSS Secretariat at the BIS for their able support. The CPSS is also grateful to its former Chairmen, Mr William McDonough, who initiated the exercise, and Mr Wendelin Hartmann for his constant encouragement and support for this endeavour.

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

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Part 1 - The Core Principles

Section 1: Introduction

1.1 Safe and efficient payment systems are critical to the effective functioning of the financial system. Payment systems are the means by which funds are transferred among banks, and the most significant payment systems, which this report refers to as systemically important payment systems,[1] are a major channel by which shocks can be transmitted across domestic and international financial systems and markets. Robust payment systems are, therefore, a key requirement in maintaining and promoting financial stability. Over the past few years, a broad international consensus has developed on the need to strengthen payment systems by promoting internationally accepted standards and practices for their design and operation.

1.2 The Core Principles in this report are intended for use as universal guidelines to encourage the design and operation of safer and more efficient systemically important payment systems worldwide. In emerging market economies they are likely to be of particular relevance, because of the efforts in train in these countries to improve systems or to build new ones in order to handle better the growing payment flows from national and international financial markets.

1.3 The report is addressed to all central banks and other interested public sector agencies, as well as to all private sector owners and operators of payment systems. The Core Principles may also be of use to advisers providing international technical assistance on how to achieve safety and efficiency in payment systems in the specific circumstances of individual countries.

1.4 These Core Principles for payment systems are intended to be sufficiently broad in scope to apply to a wide range of circumstances and to be useful over time. All systemically important payment systems should comply with all 10 Core Principles. Core Principles IV and V include specific minima, but in most cases systems should aim for standards higher than these minima. The report also explains the key role of central banks and sets out their responsibilities in applying the Core Principles. These responsibilities include assessing existing payment systems against the Core Principles and initiating or promoting action to ensure that they are implemented.

1.5 This report draws extensively on previous work of the CPSS and related groups,[2] most importantly on the Report to G10 Governors of the Committee on Interbank Netting Schemes ("the Lamfalussy Report"). That report, published in 1990,[3] analysed issues affecting cross-border and multicurrency netting schemes and established minimum standards and more general goals for the design and operation of such schemes as well as principles for their cooperative oversight by central banks. The "Lamfalussy Standards" have been accepted and applied increasingly widely, not only in the specific field for which they were developed, but also to payment, clearing and settlement systems of many other types. The Core Principles in this report extend the Lamfalussy Standards by adding several new core principles and apply more broadly to systemically important payment systems of all types. This report's discussion of central banks' responsibilities in applying the Core Principles similarly adds to the principles for cooperative central bank oversight contained in the Lamfalussy Report and extends them to domestic systems. The Lamfalussy Standards were instrumental in encouraging designers, operators and overseers of netting systems to consider and address risks and to achieve certain minimum standards. Best practice, however, is more demanding and an increasing number of systems have recognised the benefits of, for example, being able to withstand the failure of more than the single largest net debtor to the system.

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1 For a fuller definition of systemically important payment systems, see Paragraph 3.0.2.

2 The past work of the CPSS and related groups has included detailed analysis of payment and settlement system infrastructure in both developed and emerging economies. Although most of the earlier work has been analytical rather than prescriptive, in some areas - notably the work on cross-border and multicurrency netting and on foreign exchange settlement risk - more specific guidelines and strategies have been developed to reduce risk, particularly systemic risk.

3 *Report of the Committee on Interbank Netting Schemes of the Central Banks of the Group of Ten Countries*, BIS, November 1990. Copies can be obtained from the CPSS Secretariat, Bank for International Settlements; the report is also available on the BIS website (www.bis.org).

1.6 At the same time there has been extensive progress in payment system design in the course of the past 10 years, notably in the development and widespread adoption of systems involving real-time gross settlement (RTGS), which can very effectively address the financial risks highlighted by the Core Principles.[4] Technology is evolving all the time, offering new possibilities for achieving safety and efficiency. This has enabled some recent innovations in system design to offer additional techniques for addressing financial risks and reducing liquidity costs for participants. Some of these new designs are discussed in Part 2 of the report (Box 8).

1.7 The focus of this report is on payment systems, that is systems that comprise a set of instruments, procedures and rules for the transfer of funds among system participants. The most direct application is for systems which involve only funds transfers, but the Core Principles can also apply to the payments aspects of systemically important systems in which transfers of other financial assets, such as securities, and related transfers of funds are both settled. Such systems can raise financial stability issues in their own right, so it is important too that their overall design and operation should be safe and efficient. The Core Principles in this report may also provide some help in evaluating the arrangements for settling other types of financial assets, but a full consideration lies outside the scope of this report. A separate task force, established by the CPSS and IOSCO, has been examining the specific issues involved in securities settlement.[5]

1.8 The Core Principles apply to systemically important payment systems, whether they involve credit or debit transfers, whether they involve electronic or manual processing, and whether they process electronic or paper-based instruments. In practice, however, for a system that uses paper-based debit instruments (eg cheques), there are particular difficulties involved in satisfying some of the Core Principles. Such systems are very common in many parts of the world. In countries where an existing systemically important payment system uses cheques, it may be necessary to give careful consideration to the other options available. The report suggests ways in which these systems can be made safer and discusses the role they might play within the national payments infrastructure as a whole.

1.9 A summary of the 10 Core Principles and the four responsibilities of central banks in applying them follows this introduction. After that there is a more detailed description of the public policy objectives of safety and efficiency (Section 2), the Core Principles (Section 3) and the responsibilities of central banks in applying the Core Principles (Section 4). Section 5 introduces Part 2 of the report, which begins with an explanation of the scope of application of the Core Principles and guidance on how to identify systemically important payment systems (Section 6). The report then discusses the interpretation and implementation of each of the Core Principles (Section 7) and central bank responsibilities (Section 8) in a variety of economic and institutional circumstances. Two special situations - the use of paper-based debit instruments such as cheques, and payment systems with cross-border aspects - are discussed in Section 9. The final section discusses some general issues that arise in using the Core Principles, including, in particular, possible ways of conducting major programmes of reform or development of a country's systemically important payment systems.

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[4] There are a number of variants in the design and operation of RTGS systems, notably in respect of operating arrangements and the use of intraday credit to provide liquidity, and these and other issues are discussed in the 1997 CPSS report on Real-Time Gross Settlement Systems, BIS, March 1997. Copies can be obtained from the CPSS Secretariat, Bank for International Settlements; the report is also available on the BIS website (www.bis.org).

[5] That task force was established in December 1999. A consultative report is available on the BIS website (www.bis.org).

The Core Principles and central bank responsibilities

Public policy objectives: safety and efficiency in systemically important payment systems

Core Principles for systemically important payment systems

I. The system should have a wellfounded legal basis under all relevant jurisdictions.

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.

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.

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.

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.

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.

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

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

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

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

* Systems should seek to exceed the minima included in these two Core Principles.

Responsibilities of the central bank in applying the Core Principles

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.

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

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.

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.

Section 2: The public policy objectives

2.1 Systemically important payment systems are an essential mechanism supporting the effectiveness of financial markets. They can also transmit financial shocks. Poorly designed systems can contribute to systemic crises if risks are not adequately contained, with the result that financial shocks are passed from one participant to another. The effects of such disruption could extend beyond the system and its participants, threatening the stability of money markets and of other domestic and international financial markets. Systemically important payment systems are therefore crucial for the economy, and their safety and efficiency should be objectives of public policy.

2.2 Market forces alone, however, will not necessarily achieve the objectives of safety and efficiency sufficiently, since operators and participants do not necessarily bear all the risks and costs. They may not have adequate incentives to minimise the risk of their own failure or the failure of a participant or the costs they impose on other participants. In addition, the institutional structure of the payment system may not provide strong incentives or mechanisms for efficient design and operation. Economic factors such as economies of scale and barriers to entry may limit competition in the provision of payment systems and services. In practice, in many countries there is a very limited number of payment system providers or a single provider, usually the central bank.

2.3 To pursue the objective of safety in a payment system, it is necessary first to identify and understand how risks of various types may arise or be transmitted within the system and to determine where they are borne. Once these risks are properly analysed and assessed, appropriate and effective mechanisms must be devised to monitor, manage and control them.

2.4 Payment systems consume substantial resources. Accordingly, it is important that the designers and operators of payment systems are conscious of the resource costs of their systems and the charges they will need to pass on to users if resources are to be used efficiently. Cost constraints are likely to require choices to be made about a system's design which will have an impact on the system's functionality and safety. The functionality required will vary from one system to another according to the demands of participants and their customers. Systemically important payment systems must always achieve a high level of safety appropriate to their potential for triggering or transmitting systemic risk. Little, however, would be gained if a payment system were designed with such extensive safety features that it became so difficult, slow or costly to use that no one would be prepared to do so. System operators should keep their choices under review, as financial markets and the local economy develop and as technological and economic advances improve the range of solutions available.

2.5 Safety and efficiency are not the only public policy objectives for payment system design and operation. Other objectives, however, such as crime prevention, competition policy and consumer protection, can play a role in the design of systemically important payment systems, but these issues are beyond the scope of this report.

2.6 Different aspects of the safety and efficiency objectives may be pursued by a variety of different public sector agencies. Central banks have a leading role, particularly because of their strong interest in financial stability, their role in providing settlement accounts for payment system participants, and their concerns with the functioning of money markets for the implementation of monetary policy and with maintaining confidence in the domestic currency both in normal circumstances and in a crisis. The expertise they have developed through carrying out these functions means that central banks have a leading role to play in respect of systemically important payment systems; in many cases they have been given explicit responsibilities in this area.

Section 3: Core Principles for systemically important payment systems

3.0.1 A range of risks can arise in payment systems, taking the following forms in that context:

credit risk: the risk that a party within the system will be unable fully to meet its financial obligations within the system either when due or at any time in the future;

liquidity risk: the risk that a party within the system will have insufficient funds to meet financial obligations within the system as and when expected, although it may be able to do so at some time in the future;

legal risk: the risk that a poor legal framework or legal uncertainties will cause or exacerbate credit or liquidity risks;

operational risk: the risk that operational factors such as technical malfunctions or operational mistakes will cause or exacerbate credit or liquidity risks; and

systemic risk: the risk that the inability of one of the participants to meet its obligations, or a disruption in the system itself, could result in the inability of other system participants or of financial institutions in other parts of the financial system to meet their obligations as they become due. Such a failure could cause widespread liquidity or credit problems and, as a result, could threaten the stability of the system or of financial markets.

3.0.2 The Core Principles apply to systemically important payment systems. A payment system is systemically important where, if the system were insufficiently protected against risk, disruption within it could trigger or transmit further disruptions amongst participants or systemic disruptions in the financial area more widely. The initial disruption might, for example, be caused by the insolvency of a participant. Systemic importance is determined mainly by the size or nature of the individual payments or their aggregate value. Systems handling specifically large-value payments would normally be considered systemically important. A systemically important system does not necessarily handle only high-value payments; the term can include a system which handles payments of various values, but which has the capacity to trigger or transmit systemic disruption by virtue of certain segments of its traffic. In practice the boundary between payment systems which are systemically important and those which are not is not always clear cut and the central bank needs to consider carefully where that boundary should be drawn. (Part 2 discusses this judgment in more detail.) The Core Principles may also be useful in assessing and understanding the characteristics of systems which pose relatively little systemic risk and it may be desirable for such systems to comply with some or all of the Core Principles.

3.0.3 Systemically important payment systems may be owned and operated by central banks or by private sector institutions. There are also cases where they are owned and operated jointly by public and private agencies. The Core Principles are intended to be relevant to all institutional and ownership structures. They address primarily the design and operation of payment systems, but are intended also to influence the actions of participants and of agencies that supervise participants. The role and responsibilities of the operator and the participants should be clearly defined and understood. The central bank has key responsibilities in applying the Core Principles, which are described more fully in Section 4.

3.0.4 Although the Core Principles are expressed in terms of payment systems in a single country, they are equally applicable where the payment system arrangements extend over a broader economic area, such as where a single payment system or a collection of interconnected payment systems cover a region broader than a country. The Core Principles also apply to multicurrency payment systems and to payment systems with cross-border aspects.

Core Principles

I. The system should have a well founded legal basis under all relevant jurisdictions.

3.1.1 The rules and procedures of a system should be enforceable and their consequences predictable. A system which is not legally robust or in which the legal issues are poorly understood could endanger its participants. Poor understanding can give participants a false sense of security, leading them, for example, to underestimate their credit or liquidity exposures.

3.1.2 The legal environment relevant to Core Principle I includes the general legal infrastructure in the relevant jurisdictions (such as the law relating to contracts, payments, securities, banking, debtor/creditor relationships, and insolvency) as well as specific statutes, case law, contracts (for example, payment system rules) or other relevant material.

3.1.3 The jurisdiction under whose law the system's rules and procedures are to be interpreted should be specified clearly. In most cases, the most important legal environment will be the domestic one, although, in particular where the system involves cross-border elements such as foreign bank participation or the use of multiple currencies, it will also be necessary to consider whether there are any material legal risks stemming from other relevant jurisdictions.

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.

3.2.1 Participants, the system operator, and other involved parties - in some cases including customers - should understand clearly the financial risks in the system and where they are borne. An important determinant of where the risks are borne will be the rules and procedures of the system. These should define clearly the rights and obligations of all the parties involved and all such parties should be provided with up-to-date explanatory material. In particular, the relationship between the system rules and the other components of the legal environment should be clearly understood and explained. In addition, key rules relating to financial risks should be publicly disclosed.

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.

3.3.1 The rules and procedures of a systemically important payment system are not only the basis for establishing where credit and liquidity risks are borne within the system, but also for allocating responsibilities for risk management and risk containment. They are, therefore, an important mechanism for addressing the financial risks which can arise in payment systems. A system's rules and procedures should therefore ensure that all parties have both the incentives and the capabilities to manage and contain each of the risks they bear and that limits are placed on the maximum level of credit exposure that can be produced by each participant. Limits on credit exposure are likely to be particularly relevant in systems involving netting mechanisms.

3.3.2 There are a variety of ways in which risks can be managed and contained using both analytical and operational procedures. Analytical procedures include ongoing monitoring and analysis of the credit and liquidity risks participants pose to the system. Operational procedures include the implementation of risk management decisions through limits on exposures, by prefunding or collateralising obligations, through the design and management of transaction queues or through other mechanisms. For many systems, the use of risk management processes that operate in real time will be a key element in satisfying Core Principle III.

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.

3.4.1 Core Principle IV relates to daily settlement in normal circumstances. Between the time when payments are accepted for settlement by the payment system (including satisfaction of any relevant risk management tests, such as the application of limits on exposures or availability of liquidity) and the time when final settlement actually occurs, participants may still face credit and liquidity risks. These risks are exacerbated if they extend overnight, in part because a likely time for the relevant authorities to close insolvent institutions is between business days. Prompt final settlement helps to reduce these risks. As a minimum standard, final settlement should occur at the end of the day of value.

3.4.2 In most countries it should be a goal for at least one payment system to exceed this minimum standard by providing real-time final settlement during the day. This is particularly desirable in countries with large volumes of high-value payments and sophisticated financial markets. An effective intraday liquidity mechanism is necessary for this development in order to ensure that prompt final settlement is not only available, but is achieved in practice.

3.4.3 Core Principle IV relates to the promptness of settlement on the intended day of value. Nothing in it prevents a system from offering a facility for entering payment details in advance of that day.

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.

3.5.1 Most multilateral netting systems defer settlement of participants' obligations. Multilateral netting can create the risk that, if a participant is unable to meet its settlement obligations, other participants will face unexpected credit and liquidity risks at the time of settlement. The amount at risk can be much greater than the net amounts due. The risk is exacerbated the longer settlement is deferred. This combination of multilateral netting and deferred settlement was the focus of Lamfalussy Standard IV, which specified that, at a minimum, such netting systems must be able to withstand the failure of the largest single net debtor to the system. Such systems therefore need strong controls to address this settlement risk, and many payment systems that settle on a net basis have introduced arrangements to limit credit and liquidity risk and to ensure access to liquidity in adverse circumstances.

3.5.2 Systems which satisfy only this minimum standard are still exposed to the financial risks of the failure of more than one institution during the same business day. The circumstances in which one large net debtor is unable to meet its settlement obligations to the system may well be those in which other institutions are also under liquidity pressure. Best international practice now is, therefore, for such systems to be able to withstand the inability to settle of more than the one participant with the largest single settlement obligation. Careful consideration should be given to this approach and its implications should be evaluated taking into account the benefits of reduced settlement risk and any other consequences such as for the management of liquidity. In addition, alternative system designs (such as real-time gross settlement systems or hybrid systems) are increasingly being adopted to reduce or eliminate settlement risk.

3.5.3 Core Principle V adopts the wording of Lamfalussy Standard IV almost unchanged, and it remains a universal minimum standard for multilateral netting systems, which should be exceeded wherever possible. It is not relevant for real-time gross settlement systems. If systems of other types, such as hybrid systems, involve multilateral netting or the deferral of settlement, the central bank may need to consider whether the risks are similar. If they are, a similar approach of applying at least the minimum standard, and preferably a higher standard, should be followed.

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.

3.6.1 Most systems involve the transfer of an asset among system participants to settle payment obligations. The most common form of such an asset, which is also the preferable form, is an account balance at the central bank, representing a claim on the central bank. There are, however, examples of other forms of settlement asset, representing a claim on a supervised institution.

3.6.2 The settlement asset must be accepted by all participants in the system. Where an asset other than a claim on a central bank is used, the system's safety depends in part on whether the asset leaves the holder with significant credit risk or liquidity risk. This form of credit risk arises if there is more than a negligible risk that the issuer of the asset could fail. Liquidity risk arises in this context if the asset might not be readily transferable, for example into claims on a central bank or other liquid assets. In either case, the system could face a crisis of confidence, which would create systemic risk. Balances at the central bank are generally the most satisfactory asset used for settlement, because of the lack of credit or liquidity risk for the holder, and they are typically used in systemically important payment systems. If settlement is completed using other assets, such as claims on a commercial bank, those assets must carry little or no financial risk.

3.6.3 In some payment systems minimal use is made of a settlement asset. For example, they may settle by offsetting one claim against another. This can be consistent with Core Principle VI provided that there is no inconsistency with other Core Principles, particularly with Core Principle I, which requires the legal basis for the offset process to be sound.

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

3.7.1 Market participants rely on payment systems for settling their financial market transactions. To ensure the accuracy and integrity of these transactions, the system should incorporate commercially reasonable standards of security appropriate to the transaction values involved. These standards rise over time with advances in technology. To ensure completion of daily processing, the system should maintain a high degree of operational resilience. This is not just a matter of having reliable technology and adequate backup of all hardware, software and network facilities. It is also necessary to have effective business procedures and well trained and competent personnel who can operate the system safely and efficiently and ensure that the correct procedures are followed. This, together with good technology, will, for example, help to ensure that payments are correctly and quickly processed and that risk management procedures, such as limits, are observed.

3.7.2 The degree of security and reliability required to provide adequate safety and efficiency depends on the importance of the system, as well as any other relevant factors. The degree of reliability required may, for example, depend on the availability of alternative arrangements for making payments in contingency situations.

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

3.8.1 Operators, users (that is participants, such as banks and their customers) and overseers of systems all have an interest in the efficiency of a system. They want to avoid wasting resources and, other things being equal, would wish to use fewer resources. There will typically be a trade-off between minimising resource costs and other objectives, such as maximising safety. Within the need to meet these other objectives, the design of the system, including the technological choices made, should seek to economise on relevant resource costs by being practical in the specific circumstances of the system, and by taking account of its effects on the economy as a whole.

3.8.2 The costs of providing payment services will depend on the quality of service and the features demanded by users, and on the need for the system to meet the Core Principles limiting risk in the system. A system which is consistent with the demands of the markets it

serves is likely to be more heavily used; if it also satisfies the Core Principles, it spreads more widely the risk-reducing benefits as well as the costs of providing the services.

3.8.3 Designers and operators of payment systems need to consider how to provide a given quality of service, in terms of functionality, safety and efficiency, at minimum resource cost. The relevant costs are not just those passed on to users through system charges, but those of the total resources used by the system and its users in providing the payment services. They will need, for example, to take into account any indirect costs to users, such as the costs of liquidity and collateral.

3.8.4 The availability of liquidity in a system can be an important element in its smooth operation. Recipients like to be paid in funds which are immediately reusable and so value the advantages of systems with intraday settlement. Senders, however, may face costs in raising liquidity to enable them to pay early in a system. Where systems have inadequate intraday liquidity mechanisms, they can face a risk of slow turnover or even gridlock (where participants are each waiting for the others to pay first). In the interests of efficiency, systems should provide participants with adequate incentives to pay promptly. The supply of intraday liquidity is particularly important for systems with real-time settlement. Factors relevant to supply include the depth of interbank money markets and the availability of any relevant collateral. With the benefits of smooth payment flows in mind, the central bank should consider whether and how to provide intraday liquidity to support a system's daily functioning.

3.8.5 The technology and operating procedures used to provide payment services should be consistent with the types of services demanded by users, reflecting the stage of economic development of the markets served. The design of the payment system should therefore be appropriate for the country's geography, its population distribution and its infrastructure (such as telecommunications, transportation and banking structure). A particular design or technological solution which is right for one country may not be right for another.

3.8.6 Systems should be designed and operated so that they can adapt to the development of the market for payment services both domestically and internationally. Their technical, business and governance arrangements should be sufficiently flexible to respond to changing demands, for example in adopting new technologies and procedures.

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

3.9.1 Access criteria that encourage competition amongst participants promote efficient and low-cost payment services. This advantage, however, may need to be weighed against the need to protect systems and their participants from participation in the system by institutions that would expose them to excessive legal, financial or operational risks. Any restrictions on access should be objective and based on appropriate risk criteria. All access criteria should be stated explicitly and disclosed to interested parties.

3.9.2 The rules of the system should provide for clearly specified procedures for orderly withdrawal of a participant from the system, either at the participant's request, or following a decision by the system operator that the participant should withdraw. A central bank's actions in withdrawing access to payment system facilities, or to settlement account services, may also lead to the withdrawal of a participant from a payment system, but it may not be possible for a central bank to specify explicitly in advance all the circumstances in which it might act in this way.

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

3.10.1 Payment system governance arrangements encompass the set of relationships between the payment system's management and its governing body (such as a board of directors), its owners and its other stakeholders. These arrangements provide the structure through which the system's overall objectives are set, how they are attained and how performance is monitored. Because systemically important payment systems have the potential to affect the wider financial and economic community, there is a particular need for effective, accountable

and transparent governance, whether the system is owned and operated by the central bank or by the private sector.

3.10.2 Effective governance provides proper incentives for management to pursue objectives that are in the interests of the system, its participants and the public more generally. It also ensures that management has the appropriate tools and abilities to achieve the system's objectives. Governance arrangements should provide accountability to owners (for example, to the shareholders of a private sector system) and, because of the system's systemic importance, to the wider financial community, so that those served by the payment system can influence its overall objectives and performance. An essential aspect of achieving accountability is to ensure that governance arrangements are transparent, so that all affected parties have access to information about decisions affecting the system and how they are taken. The combination of effective, accountable and transparent governance provides a foundation for compliance with the Core Principles as a whole.

Section 4: Responsibilities of the central bank in applying the Core Principles

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.

4.1.1 Designers and operators of private sector payment systems, and participants and other users of all systems, as well as other interested parties, need to have a clear understanding of the central bank's role, responsibilities and objectives in relation to payment systems. They need also to understand how the central bank intends to achieve those objectives, whether by formal powers or other means. This will enable those parties to operate in a predictable environment and to act in a manner that is consistent with those objectives and policies.

4.1.2 The central bank should therefore have clear payment system objectives. It should also define clearly and disclose major policies that will affect the operators and users of systems to ensure that they are well understood and to build support for them.

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

4.2.1 The central bank is often the operator of one or more systemically important payment systems. It therefore can and should ensure that they comply with the Core Principles.

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.

4.3.1 Where systemically important payment systems are not operated by the central bank, it should oversee their compliance with the Core Principles. The central bank's oversight of systems should have a sound basis. There may be a wide variety of means by which this can be achieved, depending on the country's legal and institutional framework. Some countries have a statute-based system of oversight with specific tasks, responsibilities and powers assigned to the central bank and sometimes also to other agencies. Others have regimes based on custom and practice, which rely on non-statutory approaches. Either approach can work in its own setting - depending on the legal and institutional framework of the country concerned and the acceptance of the approach by the institutions overseen. The potential benefits of a statute-based approach to oversight, however, deserve serious consideration in countries newly establishing or significantly revising the oversight role and related policies.

4.3.2 The central bank should ensure that it has the expertise and resources to carry out its oversight functions effectively. It should not use its oversight role to disadvantage private sector systems relative to those which it owns and operates itself, but to ensure that the combination of public and private sector provision meets the public policy objectives.

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.

4.4.1 A number of different authorities can have an interest in the safe and efficient functioning of payment systems. In addition to central banks, in their capacities as operators or overseers, they can include legislative authorities, ministries of finance, supervisors and competition authorities. In particular, oversight of a country's payment systems, surveillance of its financial markets and supervision of financial institutions are complementary activities, which may be carried out by different agencies. A cooperative approach is likely to assist the fulfilment of all the relevant public policy goals.

4.4.2 Payment system oversight concentrates on the stability of a payment system as a whole, while the supervisors of individual banks and other financial institutions focus on the risks to specific participants. In particular, in assessing payment system risks, overseers may need

to take into account the ability of individual participants to fulfil their responsibilities in the system. In monitoring the financial risks for an individual institution, the supervisors may need to take into account risks to which participants can be exposed as a result of participation in the systems and which could affect the viability of the institution. Regular exchanges of views and information between supervisors and overseers, including, where relevant, about key individual participants, can assist these complementary objectives. These exchanges can often benefit from agreements on the sharing of information.

4.4.3 Cooperation is particularly important for systems with cross-border or multicurrency characteristics. The principles for cooperative central bank oversight set out in Part D of the Lamfalussy Report provide a framework for such cooperation.

Part 2 - Implementing the Core Principles

Section 5: Introduction to Part 2

5.1 The first part of this report identifies safety and efficiency in systemically important payment systems as fundamental objectives of public policy. It sets out 10 Core Principles for the design and operation of such systems and describes the leading role of central banks in pursuing the objectives, identifying four specific central bank responsibilities.

5.2 The second part of the report provides guidance on how to interpret and use the Core Principles in practice. It starts with a discussion of the circumstances in which the Core Principles should be applied. Then it offers more detailed explanation of each of the Core Principles and responsibilities, drawing on the experience of how they have been implemented effectively in particular countries and giving generalised examples of ways to interpret and implement them. It is intended to help designers, operators and overseers of systemically important payment systems form judgments about the policy and technical choices they face. It develops some of these issues in a series of boxes which give more detailed examples of the ideas discussed in the main text.

5.3 The diversity of countries' social, economic and payments infrastructure, related in part to their stage of development, geography and population, means that few of the examples are likely to be relevant everywhere. None of them should be taken as a universal prescription. But collectively the examples are intended to help explain the purpose of each of the Core Principles and responsibilities. The Core Principles and responsibilities themselves are intended to apply to systemically important payment systems in all circumstances, but the way in which they are met can vary.

5.4 In discussing policy considerations, the report can give specific guidance. In considering technological issues, however, the report generally avoids making judgments on specific current technologies. Rapid technological progress offers many new opportunities to improve payment systems, for example by increasing the variety of services available, or by reducing their cost. It offers new methods to achieve the objectives of safety and efficiency and is likely to continue to have a significant impact on the implementation of the Core Principles in practice. It is difficult to predict accurately the speed and evolution of technological progress. For example, technology is changing the possibilities in the area of security and operational reliability, where much work is currently being undertaken, notably in the use of internet-related technologies.

5.5 Technological developments are also enabling new payment system designs. The report makes several references to the effectiveness of well designed real-time gross settlement systems in meeting the Core Principles; such systems are tried and tested. They have been introduced successfully in 40 or more countries around the world and have reduced systemic risk. They are a means to achieving safety and efficiency in systemically important payment systems, not a goal in themselves. There are several examples of new settlement methods which also offer intraday finality of settlement and both the designs and technology of such systems are continuing to evolve rapidly. Although the report comments only briefly on these developing new techniques as experience is still being gained on all the implications of their design, they offer new possibilities for complying with the Core Principles.

Section 6: Scope of application of the Core Principles

6.1 The Core Principles are intended to be applied in all countries, within a realistic timescale,[6] 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, in making an initial assessment of payment systems, in designing reform projects, and when changes are considered to an existing system. In addition, systemically important payment systems should be monitored regularly for their continued compliance with the Core Principles.

6.2 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 10 to 20 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 In the context of this report, a payment system is a set of instruments, procedures and rules for the transfer of funds among system participants. It is typically based on an agreement among the participants in the system and the system operator, and the transfer of funds is effected using an agreed technical infrastructure. Participants can be direct or indirect (see Box 11 on tiered settlement arrangements).

6.5 The report recognises the wider purpose that payment systems serve in an economy, but it is not directly concerned with the rights and obligations of parties other than system operators, system participants, settlement institutions 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. Similarly, the provision of payment services by a bank to other payment intermediaries is not a central concern of the report (see Paragraph 6.10).

Identifying systemically important payment systems

6.6 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.

6.7 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.

6.8 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,

[6] It is not possible to set universally applicable deadlines for assessment or for implementation of any necessary reform, but the goal should be early assessment and, where necessary, a realistic and detailed reform plan in response to it.

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.

6.9 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.

6.10 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. These are typically bilateral arrangements between the bank and the relevant account holder and would not normally be subject to the Core Principles. With greater consolidation in the financial sector, such payment services could become increasingly important. In certain cases, these arrangements could possess some characteristics of a payment system (see Paragraphs 6.4-5 for a discussion of what constitutes a payment system) and a decision has to be made on whether such arrangements are systemically important. Cooperation between bank supervisors and payment system overseers is needed to identify and analyse these cases and to determine whether the Core Principles should be applied. Where the Core Principles are applied, it is likely, as discussed in Responsibility D, that the banking supervisor and the payment system overseer will need to cooperate on an ongoing basis in evaluating the risk and efficiency aspects of such payment system arrangements. In cases where it is decided not to apply the Core Principles, they may nevertheless be of some help in evaluating risk and efficiency and there could be a role for the payment system overseer to assist the bank supervisor.

6.11 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

6.12 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 (see Box 7). The amounts involved are often large and such systems may well be systemically important.

6.13 Most, if not all, of these Core Principles are relevant to payment mechanisms associated with securities settlement systems. There are also additional and distinct issues connected with the transfer of securities. Central banks have a clear interest in the safety and efficiency of such systems, in particular of the payment aspects (see Paragraph 2.6). In some countries, securities regulators have a leading responsibility for the oversight of securities settlement 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.[7]

[7] See Paragraph 1.7 referring to the Task Force set up jointly by the CPSS and IOSCO in December 1999 to produce 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 are 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 particularly relevant. In addition, where the system has cross-border aspects, 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. Most risk management mechanisms are based on assumptions about the rights and obligations of parties to payment transactions. Therefore, if risk management is to be sound and efficient, the rights and obligations relating to payment system operations and to risk management itself need to be established with a high degree of certainty. In particular, firmly established rights and obligations for risk management mechanisms are necessary to enable them to 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 as sound a legal basis for payment systems as possible. 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. Such contractual arrangements 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 serious 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” in insolvency law (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 changes to insolvency law.

Box 1

"Zero hour rule"

When applied in the context of a payment system, "zero hour rules" make all transactions by a bankrupt participant void 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. In either case, there could be 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 assess whether a collateralisation agreement or mechanism 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 repurchase agreement) 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 laws are 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 electronic 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 Paragraphs 10.8-14 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 Paragraph 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 UNCITRAL initiative[8] 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).

[8] See, for example, UNCITRAL Model Law on Electronic Commerce with Guide to Enactment, United Nations, 1996.

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 proceedings.
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 4A in the United States

The states are the primary source of law on commercial transactions in the United States. 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.:

§ 4A-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 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;
- the enforceability of laws and of contracts in all relevant circumstances;
- the clarity of timing of final settlement especially when there is an insolvency;
- the legal recognition of netting arrangements;
- the existence of any zero hour or similar rules;
- the enforceability of security interests provided under collateral arrangements and of any relevant repurchase agreements;
- a legal framework that would support electronic processing of payments;
- the relevant provisions of banking and central banking law;
- the relevance of laws outside the domestic jurisdiction.

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 can face through participation in the system. The parties 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 publicly disclosed. 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).

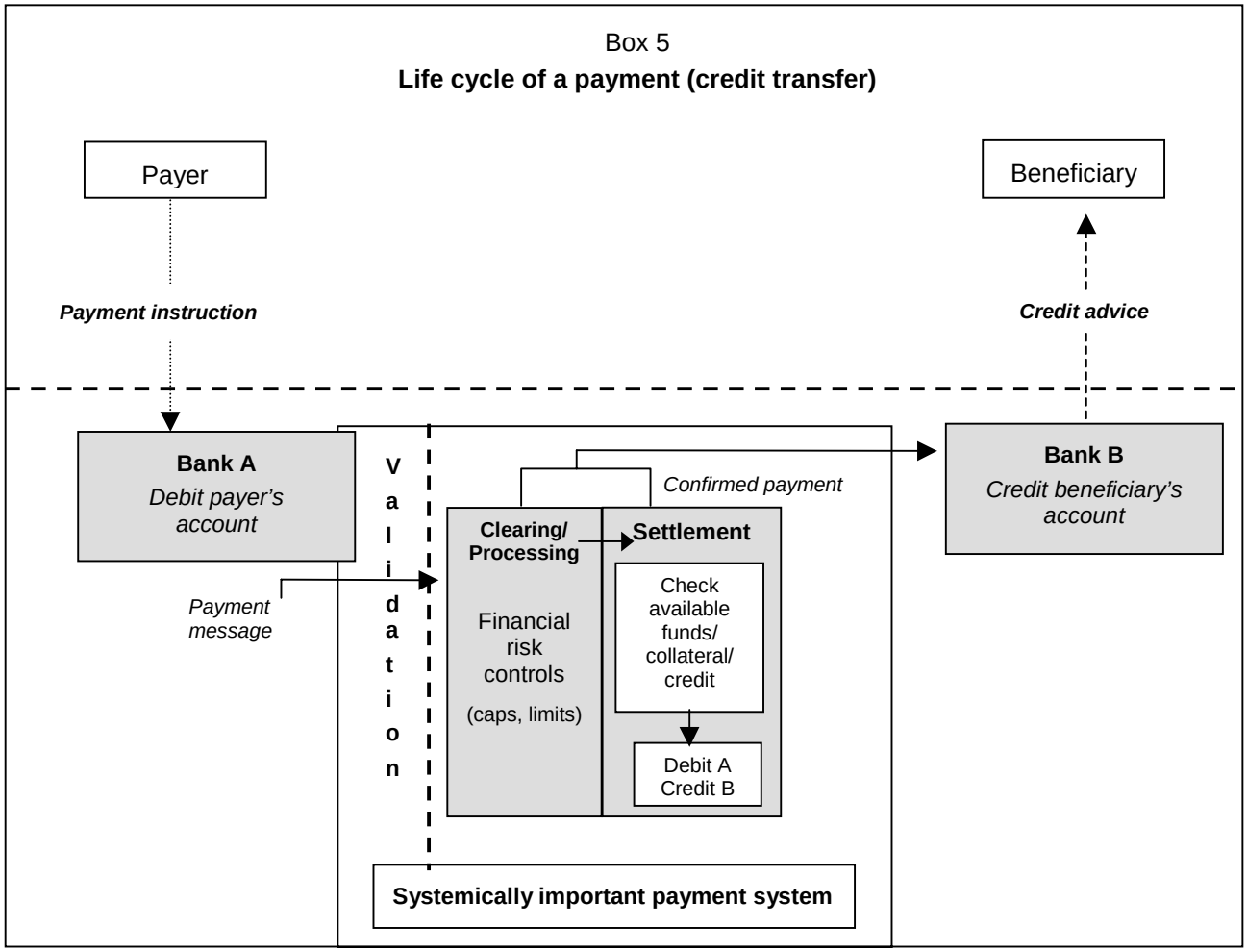
7.2.5 It is useful to include in the information provided to the parties a clear description of the typical life cycle of a payment in normal circumstances (see Box 5 for a stylised diagram of the life cycle of a payment). This information would highlight how the system processes the message, the validation 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 payment. 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 material 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 (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.[9]

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 exposure 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 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

[9] 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; the report is also available on the BIS website (www.bis.org).

within or outside the payment system. Such a system would not comply with Core Principle III (see Box 6).

Box 6

Recalculating net positions as a means of handling an inability to settle

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 its multilateral net position, even though the payments have been accepted for settlement. For example, those transactions by the failed participant that the system has 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" or "partial unwinding" of transactions, although these terms can also be used differently in some other contexts. (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 recalculation would certainly be unacceptable in a systemically important payment system.

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 credit and liquidity risks to participants that are different from those posed by systems which rely exclusively on "defaulter pays" arrangements, where each participant is required to collateralise any exposures that it creates for other participants. Paragraphs 7.5.2-4 deal with issues related to the establishment and management of pools of collateral and Paragraph 7.5.6 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.

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 Paragraph 3.8.4 in Part 1 of this report for a discussion of the effect of intraday liquidity on payment system efficiency). Similarly gridlock could 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.

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. In providing intraday liquidity, a central bank needs to have a policy (for example, on pricing or other terms) to deal with the event that such facilities are not repaid at the end of the system's operating hours.

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. In some cases, mechanisms allowing risk control limits to be varied intraday can be used to synchronise payment flows and thereby to economise on liquidity demands. Their risk implications must be analysed in the context of specific systems. All parties should also have a clear understanding of the status and treatment of payments that remain in any queue at the close of the system's operating day.

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 such liquidity in abnormal situations. In such cases, the central bank needs to consider how it can control the exposures it might incur in a range of possible situations. The system operator (if the central bank does not itself operate the system) and possibly the relevant bank supervisor might also have a role in providing incentives to participants which minimise this risk.

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 procedures 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 incentives, as well as the capacity, to identify and manage 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 providing 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.

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 (DNS) systems concerns the form and timing of settlement, not the way that payments are processed or transmitted. (See Box 9, which contains a diagram illustrating the changing status of payments within payment systems.) DNS systems can handle payments 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. The differences between these two types of design are considered below in respect of the financial risks they can involve and their implications for the cost of intraday liquidity.

Financial risks

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.

Cost of intraday liquidity

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 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

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.

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 payments 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 United States are examples of such hybrid systems. Hybrid systems are still evolving and more innovations are likely in the future. In Germany, the system RTGS-plus is being developed to include sophisticated optimisation routines of the type used in hybrid systems in order to dissolve queues. Payment scheduling can serve a similar purpose in some real-time gross settlement systems.

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. Examples of tools and of possible sources of incentives 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 based on creditworthiness (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 liquidity (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;

Possible sources of incentives to manage these risks

- 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 management tests 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 management tests. This technical acceptance is referred to as "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 management tests is such that acceptance for settlement would not take place before that day. Thus, if a system allows payments to pass the risk management tests before the day of value, then, for the purposes of this Core Principle, the requirement for prompt settlement is considered to begin 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 for settlement payment instruments that are themselves settled finally only 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.

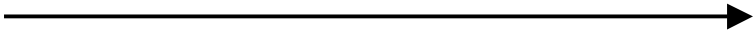
7.4.4 Achieving final settlement by the end of the day is the minimum standard. In many countries systems exist which exceed the minimum standard, by providing continuous or very frequent settlement in the course of the day. A real-time gross settlement system is a common way to accomplish this; hybrid systems can provide similarly prompt settlement. Deferred net settlement systems can also exceed the minimum standard by providing settlement not only at day-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 real-time gross settlement systems, deferred net settlement systems and hybrid systems.

7.4.5 There are significant benefits where a country has 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.

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 can be placed in a queue before being accepted for settlement. • The payment system applies its risk management tests.	• The payment has passed all risk management and other tests 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 status of the payment changes within the system and are not intended to represent specific legal terms. Core Principle IV means that the period between the acceptance of payments for settlement and their final settlement should be kept short.

Box 10

Using a central bank 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. To achieve this, 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.

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 there is no further possibility that it will be unwound, because all conditions 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.

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. Paragraphs 7.3.8-12 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 real-time gross settlement systems, deferred net settlement systems, and hybrid systems.

7.4.9 In deferred net settlement systems, the time between the acceptance of payments for settlement and final settlement should be kept short. 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, cutoff 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 cutoff 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 by participants, for example with the settlement institution. Such deposits have the advantage that they can be readily available to complete settlement quickly, which can be especially important in adverse circumstances when prompt action may need to be taken. If such deposits do not pay interest or pay it at a relatively low rate, however, system participants might prefer an arrangement involving contributions to a pool of collateral, consisting largely of interest bearing securities. Unlike 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. Such committed lines of credit without the support of 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. The implications of the proportions in which participants are obliged to post collateral need careful analysis. If participants post collateral in

proportions different from those in which losses would be borne, there can be an incentive to default on loss-sharing obligations in an effort to shift losses to those posting collateral.

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 for more than one institution to commit facilities. 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 precollateralised positions (so-called "defaulter pays" 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:
  - committed lines of credit; and
  - a pool of collateral (deposits or securities - appropriately valued) that supports them fully.
- 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. It should be noted, however, that obligations between participants are not always settled by the transfer of a settlement asset; in some cases, an offsetting process can discharge obligations. Where participants hold settlement assets, they can 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 payment has been settled, 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. Typically, claims on the central bank are not only free of this credit risk but also readily transferable into other liquid assets denominated in the same currency.

7.6.3 Where these risks exist, they can have particularly serious systemic implications, because all participants holding the settlement asset are exposed to them 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, in consultation, as appropriate, with the institution's supervisor, 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 Paragraph 7.6.6).
- 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 can be subject to the risk that participants' holdings of the settlement asset might not always be readily transferable into claims on other institutions of their choice.

7.6.7 Paragraph 3.6.3 in Part 1 of this report refers 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.

Box 11

Tiered settlement arrangements

In some systemically important payment systems all participants in the system settle across the books of a single settlement institution, usually a central bank. In other systems some participants ("direct participants") settle across the books of the settlement institution, while other participants ("indirect participants") settle across the books of direct participants. In such tiered arrangements, the settlement payments by each direct participant cover its own obligations and the obligations of any indirect participant for which it settles.

There are a number of variations of tiered settlement arrangements. In some payment systems, both direct and indirect participants are recognised explicitly in the system's rules; they can therefore be subject to the system's risk controls. Other payment systems recognise only direct participants, while other payment intermediaries (typically banks) that use the system do so solely as customers of direct participants. In all cases, the indirect participant or customer has a bilateral arrangement with the direct participant, which deals with business operations and risk controls. Exposures between the direct participant and the indirect participant or customer that can arise because the direct participant settles payments on its behalf are governed by this arrangement.

In terms of Core Principle VI, those systems without tiering and in which all participants 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 arrangements can concentrate 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 individual direct participants provide settlement services to a large number of other banks. Furthermore, in the context of a system without tiering, a higher proportion of total payments are made between direct participants and so are subject to the same rules and have the same certainty about when settlement is final. This can be more difficult to achieve in systems with tiering.

Systems with tiering can be more efficient, allowing greater competition among payment intermediaries in the provision of payment services to third parties. Some banks can choose to use settlement facilities provided by direct participants, rather than directly undertaking the investment in hardware, software and procedures necessary for direct participation, while other banks can take advantage of the revenue-earning opportunities of providing these settlement services. Liquidity management costs could be reduced when settlement is tiered because the consolidation of their customers' flows (including those of indirect participants) allows direct participants to absorb some of the liquidity needs. Tiering can also in some circumstances enable institutions whose direct participation in the system might not be possible, for example for legal reasons or because they do not qualify for access to central bank accounts, to participate indirectly, provided that the direct participant through which such an institution operates accepts and manages any risks associated with the bilateral arrangement.

The advantages and disadvantages of tiering have to be considered by system designers, system operators, participants and central banks within the context of complying with all the Core Principles.

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 purpose of the arrangement;
- 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.

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 simpler 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 business 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 19). 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.

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 12.

Box 12

Examples of international, national and industry-level standards, guidelines and recommendations

Security	
ISO/IEC TR 13335	Information technology - security techniques - guidelines for the management of IT security
ISO TR 13569	Banking and related financial services - information security guidelines
BSI 7799:1999	Information security management
ISO/IEC 15408	Evaluation criteria for IT security
ISO/IEC PDTR 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)

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 have been made suitably flexible to accommodate such changes. One important development is the use of internet-related technologies such as Transmission Control Protocols/Internet Protocols (TCP/IP), private IP networks and the public Internet. These new technologies are increasingly popular because they facilitate ready access to, and cooperative use of, information and computing resources. As with any new technology, care should be taken to ensure that the implications for security and operational reliability are well understood and addressed. Use of the internet, in particular, raises special issues, because access to the network is unrestricted and there are no guarantees of service quality. Nevertheless, the internet offers an inexpensive medium for low-risk communications, such as for publication of rules and for non-transactional communications among system participants and the operator. As technology advances, new solutions are being developed to address security and other issues.

Security

7.7.8 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 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.

7.7.9 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 coordination between the parties involved, so as to ensure that the overall operational management and control of the system is logically unified.

7.7.10 One aspect of security objectives and policies should be conformity to commercially reasonable standards, for example for confidentiality, integrity, authentication, non-repudiability, 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.

7.7.11 There is an important role for regular analyses of security risk, using recognised and structured methodologies. Such analyses 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 regularly (for example, annually) 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 13.

Box 13

Typical elements 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

7.7.12 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.

7.7.13 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 business 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 system's business continuity arrangements (see Paragraphs 7.7.18-23).

7.7.14 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 required improvement to the normal operations or business continuity arrangements.

7.7.15 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 need 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.

7.7.16 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 on peak 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.

7.7.17 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

7.7.18 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 14.) 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.

7.7.19 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.

7.7.20 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.

7.7.21 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 from adversely affecting the performance of the other payment system.

7.7.22 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 restart 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.

7.7.23 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 14

Examples of business continuity arrangements

- Use of fault-tolerant or duplicated hardware.
- Regular preventative 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.
- Availability of clear and up-to-date documentation of procedures and technical documentation at the prime and at any contingency sites.
- Regular testing at any contingency sites.
- Procedures for taking regular copies of data, and copies of software when it is changed, critical components of which should be stored off the prime 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

7.7.24 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; the 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 be 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-repudiability, availability and auditability. Security features should be tested regularly.
- The system should be subject to regular security risk analyses. The system operator should proactively monitor technological advances to keep the 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. Judgments 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 a real-time gross settlement 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.

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 15 provides an illustration of an area in which attention can be given to practicality for users.)

Box 15

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 such as straight-through processing. Participants with fewer transactions, on the other hand, might opt for simpler message transfer capabilities. In some systems, a further option for participants is to rely 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.

7.8.3 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 can 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 for 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. 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 those 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 demanded by users 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.

7.8.6 The relevant costs of using a system are borne not only by the operator and participants, but also by users 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 the system's 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 payment 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 a payment, 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 payment facilities such as system processing, telecommunications administration and governance. These costs are usually reflected in the fees and charges paid by participants 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. In this context, processing costs can also be reduced by adopting message standards that are compatible with other systems that are relevant to participants.

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 depend on two factors:

- how much liquidity the system's design requires each participant to hold in order to process its payments; and

- the opportunity cost of holding such liquidity, taking into account whether the liquidity needs to be held also for other reasons (for example regulatory or monetary policy reasons) and the terms on which intraday liquidity, including central bank liquidity, is made available to participants.

Intraday liquidity is sometimes made available by the central bank at an explicit rate of interest, in which case the cost to the participant is clear. Where no explicit interest charge is levied but the intraday facility from the central bank requires collateralisation, the cost depends on the opportunity cost of holding the collateral. Changes in public policy (for example, in monetary or regulatory policy) can affect the opportunity cost of liquidity.

7.8.12 Policies on provision of liquidity to the payment system usually focus on the terms on 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. Because extending intraday liquidity creates a credit risk, central banks employ one or more of the following risk-reducing tools:

- requiring intraday facilities to be collateralised;
- charging for intraday overdrafts;
- putting limits on the amounts which can be borrowed.

Whatever the risk-reducing tools used, there should be incentives for participants to repay by the end of the day, so as not to affect the balance sheet of the central bank overnight.

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, a system can incorporate a central scheduling mechanism or a mechanism that enables participants to manage payment priorities. The design of these mechanisms can influence the amount of liquidity that each participant needs to hold to achieve a smooth flow of payments. Some scheduling mechanisms, for example, 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. Others are based on sophisticated algorithms that can further 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 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 judgments 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 similar services elsewhere;
- excessively high setup or operational costs when a participant joins or leaves the system.

7.8.15 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;
- 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 coordination of plans will be necessary as the payment demands of the relevant market are assessed, and systems designed and implemented.

7.8.17 The advantages 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 coordination 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 16 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 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. Payment services are sometimes subsidised or cross-subsidised. 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 17 for a discussion of approaches to pricing.) In any event, where a central bank is the operator of a systemically important payment system, it should disclose the rationale for its pricing policy.

Box 16

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 judgments 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) may be more appropriate.

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; and (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 towards 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. In essence, choices must be made between 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 of 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 17

Pricing payment transactions

Pricing policies 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 participants, or in some countries by central banks.

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 Paragraph 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 and disclose publicly the extent of the subsidy as well as the period for which it will apply. In carrying out any cost-benefit analysis (see Box 16), 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. For example, operators can 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, or price differentials could be based on the level of service, to take account, for example, of value added services such as additional information or computer-to-computer links. In some systems, a further reason for differential pricing could be to reflect the fact that some participants have borne costs relating to developing the system, whereas others have not, for example because they joined the system at a later stage.

Core Principle VIII - Implementation summary

7.8.20 Several steps are involved in establishing an efficient payment system. They include identifying the general objectives, needs and constraints, and establishing an analytical framework for gauging efficiency, using various possible methods of analysis.

General

- define objectives (identifying risk and efficiency factors);
- identify the needs and constraints of participants and of users more widely;
- 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 financial institutions, 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 of systemically important payment systems, and possibly only one. 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 criteria for participation 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 can sometimes 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 (see Box 17).

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 such risk-related controls are, 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 the credit risk to which they are exposed.

7.9.7 There has been discussion in many countries over whether non-bank financial institutions, such as securities firms, should be admitted as participants in systemically important payment systems. There is no international consensus on this issue. In each country, the decision is influenced by specific local factors, such as the ability to hold an account at the central bank, access to central

bank credit facilities, the national legal structure, and the structure of the financial industry. In some countries, for example, securities firms are admitted to systemically important payment systems, or to a companion securities settlement system, in order to ensure the safe settlement of securities transactions. This participation can be on restricted terms, for example without access to the intraday liquidity facilities available to banks. In other countries, securities firms are not admitted to systemically important payment systems.

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[10] 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 forms of ownership 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 are 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 are CHIPS (United States) 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 (United Kingdom).

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 the 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 18.)

[10] 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 (www.bis.org), and *OECD Principles of Corporate Governance*, May 1999, issued by the Organisation for Economic Co-operation and Development, Paris, available on the OECD's website (www.oecd.org).

Box 18

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 18 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. Box 19 describes in general terms the purpose of audit and distinguishes between internal and external auditors.

Box 19

Internal and external audit

Audit is a means of providing independent assurance to an organisation's management or governing body of the effectiveness of the organisation's internal control system and sometimes of the organisation's operational efficiency. For example, the auditors' scope could include a payment system's governance arrangements, security controls, and procedures for managing financial and operational risks. Auditors are either internal (usually staff of the organisation), in which case the institutional structure ensures their independence from those responsible for managing the activities they audit, or external (appointed by the organisation in accordance with legal or regulatory requirements or for other reasons). The role of external auditors sometimes includes an assessment of the quality of internal audit's testing of controls.

7.10.8 Some of the tools of effective governance listed above also have a bearing on the system's accountability. Those who make up the governing body of a systemically important payment system should be accountable both to the system's owners and to the wider community of users. 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 consideration that there is no clearly defined external group, such as private shareholders, to which 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. 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 arm's-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 of 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 relevant users and due deliberation;
- the high-level decision-making process is prompt and communicated clearly and without delay, as relevant to users of the system;
- the system consistently attains projected financial results and can explain any differences from those plans;
- the system delivers payment services that satisfy the needs of participants and their customers;
- the system complies with the other nine Core Principles.

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

8.0.1 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.

8.0.2 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 they do not themselves operate as a core function that contributes to financial stability and complements 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.[11] 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.

[11] Available on the IMF website (www.imf.org).

8.0.3 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 subcontract 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).

8.0.4 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 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.

8.0.5 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 policymaking 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 judgment. 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 payment 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 and continues to comply 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. As regards the other Core Principles, some raise questions of judgment 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 sometimes 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 either for the system or from other public policy perspectives that could stem from the participation in such a system of a particular institution, or class of institutions. Compliance with Core Principle VIII means that the central bank operator should consider explicitly the needs of participants and other users. This helps it to foster efficiency and encourage wide participation in a system that is able to reduce 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 7.10.11-12 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 payment 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, although it is not necessarily limited to systemically important systems. 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-examined 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 and continues to meet 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 timescale that is reasonable for the nature of the deficiency and the necessary action.

Box 21

Examples of payment system oversight with a legislative basis

In ***Australia***, the *Payment Systems (Regulation) Act 1998* gives the Reserve Bank of Australia regulatory responsibility for the efficiency as well as stability of the payment 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 ***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 the ***euro area***, since 1 January 1999, payment system oversight is performed by the Eurosystem.[12] 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).

[12] The Eurosystem comprises the ECB and the national central banks (NCBs) of the Member States which have adopted the 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 21 (continued)

In ***Italy***, *article 146 of the 1993 Banking Law*, in line with Article 22 of the ESCB and ECB Statute, assigns the Bank of Italy 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 Bank of Italy 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 Bank of Italy published two White Papers in 1997 and 1999.

In ***Malaysia***, the legal basis for oversight powers entrusted to the central bank consists of various pieces of legislation, which include the Central Bank of Malaysia Act of 1958, the Banking and Financial Institutions Act of 1989, the Islamic Banking Act of 1983 and the Exchange Control Act of 1953. The central bank also issues guidelines and circulars to the banking and financial institutions from time to time. The central bank, together with the industry, issued a code of conduct and rules to govern participants in the system. The main objectives of payment system oversight are to minimise risks, to promote efficiency, to protect consumers/users and to ensure the ready availability of a mechanism for implementation of monetary policy. Policies and regulations are formulated and issued by the Bank Regulation Department and the Payment Systems Department, whilst on-site inspection is undertaken by the Bank Supervision Department and the Information System Supervision Unit.

In ***Mexico***, Article 2 of the Central Bank Law states that one of the aims of the Bank of Mexico is the smooth functioning of the payment system; Article 3 empowers the Bank of Mexico to regulate the payment system, and Article 31 allows it to regulate electronic funds transfers. The main objective of the function is to achieve the appropriate balance between a high level of safety and a low level of costs associated with the production of payment services. The Bank of Mexico issues regulations to pursue its objectives and, should system participants not abide by them, can apply sanctions.

In the Republic of ***South Africa***, the National Payment System Act, 1998, (Act No. 78 of 1998) (NPS Act), provides for the management, administration, operation, regulation and supervision of payment, clearing and settlement systems. The NPS Act, read with the South African Reserve Bank Act, 1989 (Act No. 90 of 1989), gives the South African Reserve Bank (SARB) powers to oversee the activities both of the payment system management body, known as the Payments Association of South Africa (PASA), and of its members. The SARB's responsibilities cover the monitoring, regulation and supervision of payment, clearing or settlement systems. The NPS Act also states that a system participant must be a member of the payment system management body and will therefore be subject to the applicable entry criteria for membership. The objectives of payment system oversight focus on ensuring the efficiency and integrity of the national payment system. To this end, the SARB may issue directives and notices and can make use of moral suasion. In addition, the SARB designed, developed and implemented the payment systems technical solution, infrastructure and payment instruments used to effect electronic settlement for participating banks across the books of the SARB.

In the ***West African Monetary Union (WAMU)***[13] there is a common central bank, the Central Bank of West African States, (BCEAO), which has the exclusive right to issue the legal tender throughout the Union. To ensure the full and effective implementation of the guiding principles of the Union, the member states have adopted uniform legislation on cheques and other financial instruments which results in banking supervision and oversight functions being based on laws which are applicable throughout the Union territory. In accordance with its statutes, the BCEAO is currently the overseer of the clearing houses in all the WAMU countries. A comprehensive payment system reform is under way. In the reformed system, the BCEAO will be entrusted formally, through its statutes, with the function of oversight of all payment systems.

[13] The Union comprises Benin, Burkina Faso, Côte d'Ivoire, Guinea Bissau, Mali, Niger, Senegal and Togo.

8.3.5 The tools that central banks 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 described briefly 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 participants are reluctant or slow to implement required reforms and the central bank 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 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, for example 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 are economics, banking, finance, information technology and law. Some central banks achieve this by identifying individuals with responsibility for oversight who coordinate contributions from other departments. An increasing number are establishing a specialist department directed to payment system oversight. Information exchange and cooperation between payment system overseers are a fruitful way of helping to ensure effective oversight.

8.3.9 If a central bank is the operator of one or more payment systems as well as the overseer of private sector systems, it needs to consider how best to address any possible conflicts of interest. In particular, it should avoid disadvantaging private sector systems relative to those which it owns and operates itself. In some countries, a structural separation between the two functions within the central bank plays a role in ensuring that this is achieved.

Box 22

Oversight tools

The tools that central banks use in overseeing payment systems include the following:

Collect information

- from written sources (financial reports, statistics, rules and procedures, minutes of meetings of governing bodies, audit reports etc) provided by payment system operators;
- through discussions with relevant parties (operators, internal and external auditors, participants, etc);
- by on-site inspection;

Analyse information

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

Take action

- publicise the objectives and policies of oversight through speeches and publications;
- persuade payment system operators to make changes to rules and procedures;
- make the provision of central bank settlement services dependent on relevant conditions;
- establish formal agreements with payment system operators.

Oversight tools can be supported by specific formal powers to collect information and to undertake actions such as licensing, issuing directives of compliance, directing a change to rules and procedures, and 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 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 payment 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 will be 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 central banks (as operators or overseers), the supervisors of financial institutions and market surveillance authorities can be a valuable tool for the practical exercise of such cooperation. Central banks should also cooperate with securities regulators where appropriate, especially where there is a linkage between a systemically important payment system and a securities settlement system.

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 includes 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 individually is usually a clearly defined task with a mandate in law. Its purpose is to promote the safe operation of these institutions. Supervised institutions 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 contribute to efficiency, transparency and fairness in financial markets and to prevent or contain 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.

The ***oversight*** of payment (and settlement) systems focuses on the stability and efficiency of each system, 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 10 Core Principles identified in the report as a means of furthering the objectives of safety and efficiency. Responsibility C is concerned specifically 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 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 multicurrency 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 multicurrency 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 multicurrency 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 multicurrency 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 multicurrency 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 provision 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[14]

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.

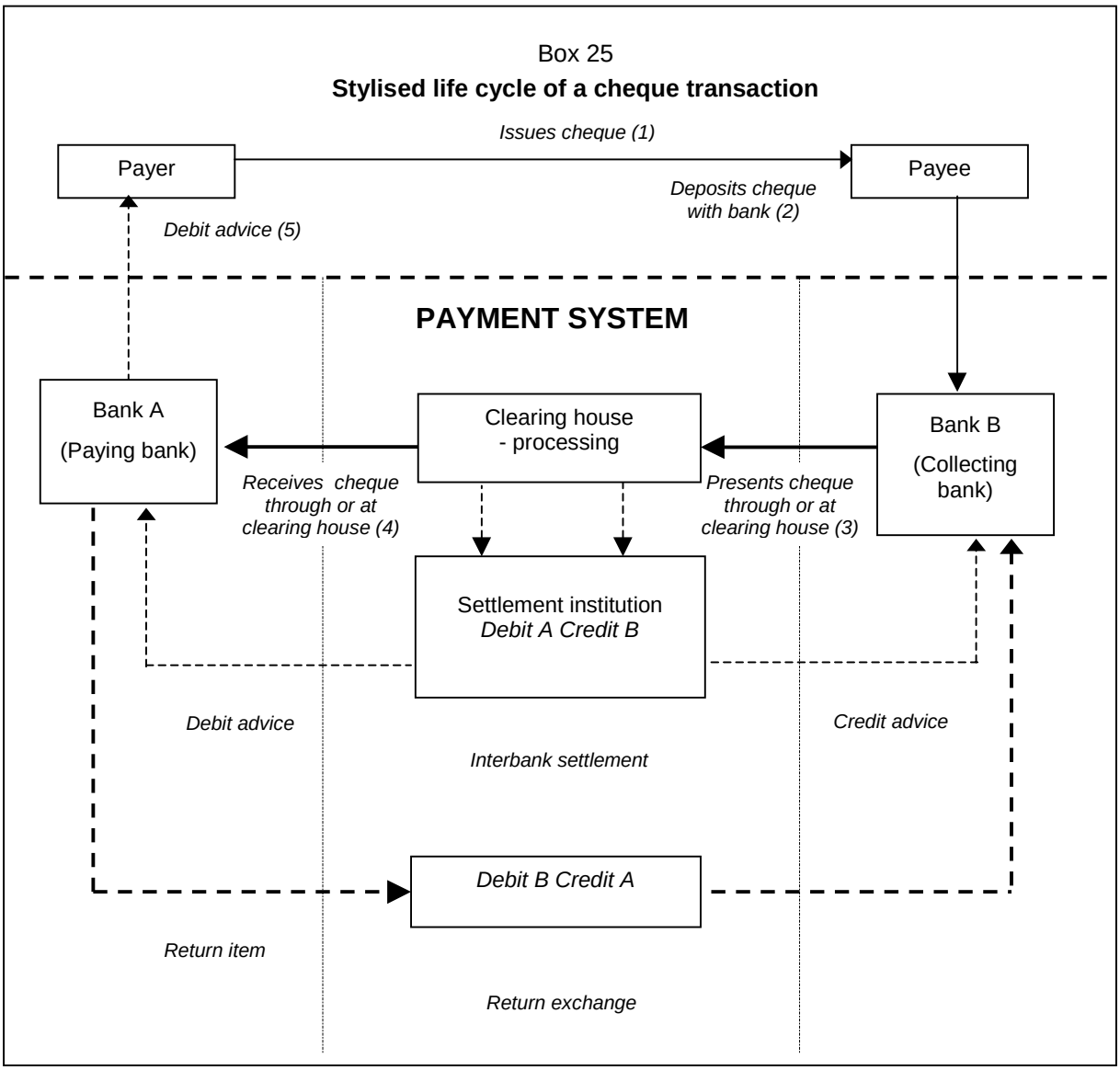
9.1.2 In general, a cheque is a written order from the drawer (payer) to his bank (paying bank), to pay a sum of money to a third party (the payee). When a cheque is delivered to a payee, the payee typically deposits the cheque in his bank (the collecting bank) for collection. When cheques are drawn 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 payer 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 can be presented to the payer 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 25 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.

[14] 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 for retail payments in selected countries*, BIS, September 2000.



Risks in cheques and in cheque clearing and settlement systems

9.1.6 Much of the discussion on 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 are 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 payer, the settlement of the cheque is subject to two credit risks: (1) that the payer, 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 feature 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 posts 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.[15] 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

[15] 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 greater the risk that a default or fraud could occur for the financial intermediaries or the payer.

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 payer 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 payer's bank is therefore faced with a settlement obligation which it cannot limit and which it cannot easily and fully predict. The payer'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.

Specialised systems based on bank cheques

9.1.15 Some specialised 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.

- ***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 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 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.

9.1.21 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 attaining compliance with the Core Principles:

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

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

9.1.22 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. System designers and operators can encourage use of the new system through price incentives, service enhancements, or by establishing specific rules for the cheque system.

9.2 Cross-border aspects of payment systems

9.2.1 Payment systems can have 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.

9.2.2 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 the 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 specific 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 multicurrency 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 for 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 10.11-14 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 (in their capacities as operators or overseers) for ensuring that systemically important payment systems comply with the Core Principles set out in this report. 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 coordinate 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 forum 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 but operated on their behalf, for example if the owner and operator is the central bank - see Paragraphs 7.10.11-12. 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 system 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 "stocktake" 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 system 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 "stocktake" is completed, it will reveal the 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 achieved.

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 nationwide 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.

Glossary

The following glossary of terms is not intended to provide legally precise definitions but to be a tool to help understand the report. Terms are defined in this glossary with particular reference to payment systems and to their usage in this report.

Acceptance for settlement — The stage in the processing of a payment at which it has passed all risk management and other tests and can be settled under the system's rules and procedures. See also Paragraph 7.4.1 and Box 9.

Access — The right or opportunity for an institution to use the services of a particular payment system to settle payments on its own account or for customers. See also *participant*, *direct participant*, *indirect participant*.

Authentication — The methods used to verify the identity of an institution, individual or hardware device involved in payment system activities and to confirm that a message has not been modified or replaced in transit.

Bilateral credit limit — See *credit limit*.

Bilateral exposure — One party's exposure to another party.

Bilateral netting — An arrangement between two parties to net their bilateral obligations. The obligations covered by the arrangement may arise from financial contracts, funds transfers or both. See also *netting*, *multilateral netting*.

Business continuity — A payment system's business continuity arrangements aim to ensure that it meets agreed service levels even if one or more components of the system fail or if it is affected by an abnormal external event. They can include both preventative measures and arrangements to deal with contingencies.

Case law — Precedents established in previously decided court cases that may influence future interpretations of law or the disposition of future court cases.

Central counterparty — An entity that interposes itself between the parties to an obligation, taking equal and opposite obligations towards each of the original parties. See also *multilateral netting.*

Cheque — A written order from one party (the drawer) to another (the drawee, normally a financial institution) requiring the drawee to pay a specified sum on demand to the drawer or to a third party specified by the drawer (the payee).

Clearing — The process of transmitting, reconciling and, in some cases, confirming payments prior to settlement, possibly including the netting of payments and the establishment of net positions for settlement.

Clearing house — A central location or central processing mechanism through which payment system participants agree to exchange payments. In this report it is a term used only in the context of cheque processing. See also *cheque*.

Collateral — An asset that is delivered by the collateral provider to secure payment or performance of an obligation to the collateral taker. For example, participants in some payment systems provide the central bank with collateral to secure their obligations in relation to the provision of intraday liquidity. Collateral arrangements may take different legal forms; collateral may be provided either by an absolute transfer of ownership/title (eg repo) or by pledge. Typically, liquid assets, such as government securities and cash, are used as collateral. See also *pledge*, *repurchase agreement (repo)*.

Collateral pool — Assets owned by members of a payment system that are collectively available to the system as collateral to enable it to obtain funds in circumstances specified in its rules. See also *collateral*.

Committed facilities — Facilities (for example, lines of credit or repo facilities) under which the provider is contractually committed to advance funds in defined circumstances. See also *repurchase agreement (repo)*.

Contract law — Body of law concerned with making and enforcing agreements.

Credit limit — Limit on the credit exposure a payment system participant incurs vis-à-vis another participant (bilateral credit limit) or vis-à-vis all other participants (multilateral credit limit) as a result of receiving payments that have not yet been settled.

Credit risk — The risk that a counterparty will not settle an obligation for full value, either when due or at any time thereafter. Examples of credit risk referred to in this report are the risk that a payment made through a payment system for subsequent settlement will not in fact be settled; and the risk to payment system participants from failure of the settlement institution. See also *settlement institution* and Paragraphs 3.1.1 and 3.6.2.

Credit transfer — An electronic or paper message authorised by the payer instructing an institution holding the payer's account to transfer funds from the payer's account to the account of a nominated payee at the same or another institution. See also *payment*.

Cross-border netting scheme — An arrangement to net positions or obligations between or among parties in more than one country or jurisdiction. See also *netting*.

Customer — A user of payment services that has no direct relationship with the system operator, typically the customer of a payment system participant or other financial intermediary. See also *direct participant*, *indirect participant*, *participant*, *user*.

Daily processing — Complete cycle of processing tasks that need to be completed in a typical business day, from start-of-day procedures to end-of-day procedures including backing-up of data.

Daily settlement — Completion of settlement on the day of value of all payments accepted for settlement. See also *day of value*.

Day of value — Day on which a payment is due to be credited to the receiving participant in the payment system. The day of value for the receiving participant's customer (that is, the day on which the receiving participant credits the customer in its books) may or may not be the same day, depending on specific agreements or local practice. See also Paragraph 7.4.1.

Debit transfer system	Funds transfer system in which debit transfer instruments (for example, cheques) made or authorised by the payer move from the financial institution of the payee to the financial institution of the payer and result in a charge (debit) to the account of the payer. See also *cheque*, *payment*, *payment system*.
Default	Failure to complete a funds transfer according to its terms for reasons that are not technical or temporary, usually as a result of insolvency.
Defaulter pays	A loss-sharing arrangement where each participant is required to collateralise any exposures that it creates for other participants. As a result, losses from a party's default are borne by the defaulting party. See also Paragraph 7.3.7.
Deferred net settlement system	Net settlement system in which there is a time lag between acceptance of a payment for settlement and its actual settlement. See also Box 7.
Direct participant	A participant in a payment system that settles payments across the books of the settlement institution for the system. See also Box 11, *participant*, *indirect participant*, *user*.
Disclosure	See *public disclosure*.
Exit criteria	Criteria for an existing participant in a payment system to cease to participate.
Final settlement	Settlement which is irrevocable and unconditional.
Financial risk	Term covering a range of risks incurred in financial transactions - both liquidity risk and credit risk. See also *liquidity risk, credit risk*.
Funds transfer	See *payment*.
Gridlock	A situation that can arise in a payment system in which the failure of some payments to be accepted for settlement (for example, because the necessary liquidity is unavailable) prevents a substantial number of other payments from other participants from being accepted for settlement. See also Paragraph 3.8.4.
Haircut	The difference between the market value of a security and its collateral value. Haircuts are taken by a lender of funds against collateral in order to protect the lender from losses owing to a decline in the market value of the security, should the need arise to liquidate the collateral.
Hybrid system	A payment system that combines characteristics of RTGS systems and netting systems. See also Box 8.
Indirect participant	A class of participant in a payment system in which there is a tiering arrangement. Indirect participants settle payments across the books of direct participants rather than across accounts with the settlement institution. See also Box 11, *customer*, *direct participant*, *participant*, *user*.
Instrument	See *payment instrument*.
Intraday credit	Credit extended for a period of less than one business day.
Intraday liquidity	Funds which can be accessed during the business day, usually to enable financial institutions to make payments in real time. See also *intraday credit*.
Legal risk	The risk of loss because of the unexpected application of a law or regulation or because a contract cannot be enforced. See also Paragraph 3.1.1.
Limit	See *credit limit*.

Liquidity risk The risk that a participant in a payment system will not settle an obligation for full value when due. Liquidity risk does not imply that a counterparty or participant is insolvent since it may be able to meet its obligations at some unspecified time thereafter. See also Paragraph 3.1.1.

Loss-sharing agreement/ arrangement An agreement between participants in a payment system regarding the allocation of any loss arising when one or more participants fail to fulfil their obligations; the arrangement stipulates how the loss will be shared among the parties concerned in the event that the agreement is activated. See also *defaulter pays*, *survivors pay*.

Multilateral credit limit See *credit limit*.

Multilateral netting An arrangement among three or more parties to net their obligations. The multilateral netting of payment obligations normally takes place in a multilateral net settlement system. See also *netting*, *deferred net settlement system*.

Net credit or debit position A participant's net credit or net debit position in a deferred settlement system is the sum of the value of all the transfers it has received up to a particular point in time less the value of all transfers it has sent. If the difference is positive, the participant is in a net credit position; if the difference is negative, the participant is in a net debit position. See also *netting*, *bilateral netting*, *multilateral netting*.

Netting The agreed creation from multiple positions or obligations of a single position/obligation which is calculated as the sum of positive positions or obligations owing less the sum of negative positions or obligations owed. Netting/offsetting may take several forms which have varying degrees of legal enforceability in the event of default of one of the parties. See also *bilateral netting*, *multilateral netting*.

Non-repudiability The ability to prevent denial or repudiation by the sender or receiver of a payment message.

Offsetting See *netting*.

Operational risk The risk that deficiencies in information systems or internal controls, human errors, or management failures will cause or exacerbate credit risks or liquidity risks.

Optimisation routine Routine processes in a payment system to determine the order in which payments are accepted for settlement. Optimisation routines are used to improve system liquidity and increase settlement efficiency. See also *queue/queuing*, *scheduling*.

Oversight A public policy activity principally intended to promote the safety and efficiency of payment systems and in particular to reduce systemic risk. See also Boxes 21 and 22.

Participant A party that is recognised in the rules of a payment system as eligible to exchange and settle payments through the system with other participants either directly or indirectly. See also *direct participant*, *indirect participant*, *user*.

Payment The payer's transfer of a monetary claim on a party acceptable to the beneficiary.

Payment instrument The form that a payment message/instruction takes in a particular payment system. See also *payment message/instruction*, *payment system*.

Payment message/ instruction	An order or message to transfer funds (in the form of a monetary claim on a party) to the order of the beneficiary. The order may relate either to a credit transfer or to a debit transfer. See also *credit transfer*, *debit transfer system*, *payment*.
Payment system	In the context of this report, a set of instruments, procedures and rules for the transfer of funds among system participants. Typically includes agreement on the technical infrastructure to be used. Sometimes, in other contexts, the term is also used to describe that infrastructure. Some other reports by the Committee on Payment and Settlement Systems have also employed a different, wider definition of "payment system". See also Paragraphs 6.4-6.5.
Pledge	A delivery of assets, without an absolute transfer of ownership/title, as security for the performance of an obligation (for example, the repayment of lending) owed by one party to another. A pledge involves the creation of a security interest over the assets in favour of the party to which they are delivered, under which the property can be sold or otherwise realised in the event of a failure to perform the underlying obligation. See also *collateral*, *repurchase agreement (repo)*.
Prefunding	The requirement that funds be available in accounts at the settlement institution before institutions use these accounts to extinguish their settlement obligations.
Public disclosure	Making information publicly accessible, for example by posting on an internet website or by making copies publicly available.
Queue/queuing	An arrangement whereby payments are held pending acceptance by a payment system for settlement. See also *acceptance for settlement*.
Real-time gross settlement (RTGS) system	A payment system in which processing and settlement take place continuously in real time (that is, without deferral) and gross (ie transaction by transaction).
Real-time processing	The processing of instructions on an individual basis at the time they are received rather than at some later time.
Real-time risk management	Process that allows risks associated with payments between payment system participants to be managed immediately and continuously.
Repurchase agreement (repo)	Contract to sell and subsequently repurchase securities at a specified time and price. See also *collateral*, *intraday liquidity*.
Risk management test	Test carried out on payments submitted to a payment system in order to establish whether processing a particular payment would cause the system or its participants greater risk than permitted under the rules of the system.
Scheduling	Technique to manage payment queues by determining the order in which payments are accepted for settlement. See also *queue/queuing*, *optimisation routines*.
Securities settlement system	A system which permits the transfer of ownership of/title to securities.
Settlement	An act that discharges financial obligations between two or more parties. The settlement of payments between participants in a payment system is the context in which the term is most commonly used in the report. See also *deferred net settlement system*, *final settlement*, *real-time gross settlement system*.
Settlement asset	An asset used for the discharge of settlement obligations as specified by the rules, regulations, or customary practice for a payment system. See also Paragraph 3.6.1.

Settlement institution	The institution across whose books transfers between participants take place in order to achieve settlement within a settlement system.
Settlement obligation	An amount due from a financial institution to other financial institutions as a result of the clearing of payments. See also *net credit or debit position*.
Settlement risk	The risk that settlement in a payment system will not take place as expected. This risk can involve both credit and liquidity risk. It can also arise as a result of operational risk.
Stakeholder	In a payment system, stakeholders are those parties whose interests are affected by the operation of the system.
Straight-through processing (STP)	Automation of processing that allows data to be entered only once and then used for all subsequent payment processes.
Supervision of financial institutions	The assessment and enforcement of compliance by financial institutions with laws, regulations or other rules intended to ensure that they operate in a safe and sound manner and that they hold capital and reserves sufficient to support the risks that arise in their business. See also Box 23.
Survivors pay	Loss-sharing arrangements which, in the event of a participant's inability to settle, require losses to be borne by the surviving participants according to some predetermined formula. See also Paragraph 7.3.7.
Systemic disruption	Events whose impacts have the potential to threaten the stability of the financial system, by transmission from one financial institution to another, including through the payment system. See also *systemic risk*.
Systemic risk	The risk that the failure of one participant in the financial system to meet its required obligations will cause other financial institutions to be unable to meet their obligations when due.
Systemically important payment system	See Paragraph 3.2.1.
Unwind	To undo a process that was presumed to have been completed. Examples of such processes might be the making, netting or settlement of a payment. In particular, removing payments from the calculation of net positions within a payment system that uses deferred net settlement is sometimes referred to as unwinding or partial unwinding. See also Box 6.
User	Payment system users comprise both participants and their customers for payment services. See also *customer*, *direct participant*, *indirect participant*, *participant*.

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Annex

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