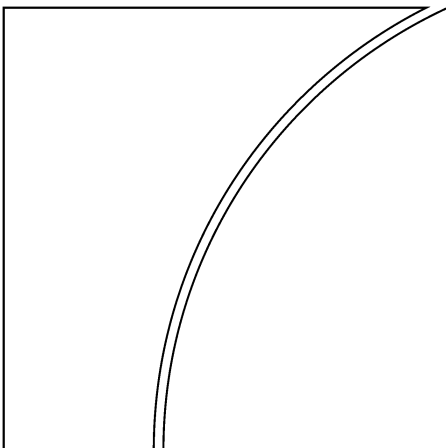


Committee on Payment and
Settlement Systems

Technical Committee of the
International Organization of
Securities Commissions



Principles for financial market infrastructures

Consultative report

March 2011



BANK FOR INTERNATIONAL SETTLEMENTS



OICU-IOSCO

Copies of publications are available from:

Bank for International Settlements
Communications
CH-4002 Basel, Switzerland

E-mail: publications@bis.org

Fax: +41 61 280 9100 and +41 61 280 8100

This publication is available on the BIS website (www.bis.org) and the IOSCO website (www.iosco.org).

© *Bank for International Settlements and International Organization of Securities Commissions 2011. All rights reserved. Brief excerpts may be reproduced or translated provided the source is stated.*

ISBN 92-9197-868-X (online)

This report is being issued now for public consultation. Comments should be sent **by 29 July 2011** to both the CPSS secretariat (cpss@bis.org) and the IOSCO secretariat (fmi@iosco.org). The comments will be published on the websites of the BIS and IOSCO unless commentators have requested otherwise.

A cover note to the report, published simultaneously and also available on the BIS and IOSCO websites, provides background information on why the report has been issued and sets out some specific topics on which comments are particularly requested.

Contents

Abbreviations	iii
Overview of principles and responsibilities	1
1.0. Introduction	5
Background	5
FMI: definition, organisation, and function	7
Public policy objectives: safety and efficiency	10
Scope of the principles for FMIs	11
Implementation and use of the principles and responsibilities	15
Organisation of the report	15
2.0. Overview of key risks in financial market infrastructures	16
Systemic risk	16
Legal risk	16
Credit risk	17
Liquidity risk	17
General business risk	17
Custody and investment risk	17
Operational risk	18
3.0. Principles for financial market infrastructures	19
General organisation	19
Principle 1: Legal basis	19
Principle 2: Governance	23
Principle 3: Framework for the comprehensive management of risks	28
Credit and liquidity risk management	30
Principle 4: Credit risk	30
Principle 5: Collateral	37
Principle 6: Margin	40
Principle 7: Liquidity risk	46
Settlement	52
Principle 8: Settlement finality	52
Principle 9: Money settlements	54
Principle 10: Physical deliveries	56
Central securities depositories and exchange-of-value settlement systems	58
Principle 11: Central securities depositories	58
Principle 12: Exchange-of-value settlement systems	61
Default management	63

Principle 13: Participant-default rules and procedures	63
Principle 14: Segregation and portability	66
General business and operational risk management.....	70
Principle 15: General business risk	70
Principle 16: Custody and investment risk.....	74
Principle 17: Operational risk	75
Access	81
Principle 18: Access and participation requirements	81
Principle 19: Tiered participation arrangements	84
Principle 20: FMI links.....	86
Efficiency	92
Principle 21: Efficiency and effectiveness	92
Principle 22: Communications procedures and standards.....	94
Transparency.....	96
Principle 23: Disclosure of rules and key procedures	96
Principle 24: Disclosure of market data.....	98
4.0. Responsibilities of central banks, market regulators, and other relevant authorities for financial market infrastructures	101
Responsibility A: Regulation, supervision, and oversight of FMIs.....	101
Responsibility B: Regulatory, supervisory, and oversight powers and resources	102
Responsibility C: Disclosure of policies with respect to FMIs	103
Responsibility D: Application of the principles for FMIs	104
Responsibility E: Cooperation with other authorities.....	105
Annex A: Mapping of existing standards to proposed standards	108
Annex B: Mapping of proposed standards to existing standards	109
Annex C: Selected RSSS marketwide recommendations.....	110
Annex D: Matrix of applicability of key considerations to specific types of FMIs	117
Annex E: Guidance for CCPs that clear OTC derivatives	128
Annex F: Oversight expectations applicable to critical service providers	134
Annex G: Bibliography	136
Annex H: Glossary	137

Abbreviations

BCBS	Basel Committee on Banking Supervision
CCP	Central counterparty
CGFS	Committee on the Global Financial System
CPSIPS	<i>Core principles for systemically important payment systems</i>
CPSS	Committee on Payment and Settlement Systems
CSD	Central securities depository
DNS	Deferred net settlement
DvD	Delivery versus delivery
DvP	Delivery versus payment
FMI	Financial market infrastructure
FSB	Financial Stability Board
ICSD	International central securities depository
IOSCO	International Organization of Securities Commissions
IT	Information technology
Lamfalussy Report	<i>Report of the Committee on Interbank Netting Schemes of the central banks of the Group of Ten countries</i>
LVPS	Large-value payment system
OTC	Over the counter
PvP	Payment versus payment
RCCP	<i>Recommendations for central counterparties</i>
Repo	Repurchase agreement
RSSS	<i>Recommendations for securities settlement systems</i>
RTGS	Real-time gross settlement
SSS	Securities settlement system
STP	Straight-through processing
TR	Trade repository

Overview of principles and responsibilities

Principles for financial market infrastructures

General organisation

Principle 1: Legal basis

An FMI should have a well-founded, clear, transparent, and enforceable legal basis for each aspect of its activities in all relevant jurisdictions.

Principle 2: Governance

An FMI should have governance arrangements that are clear and transparent, promote the safety and efficiency of the FMI, and support the stability of the broader financial system, other relevant public interest considerations, and the objectives of relevant stakeholders.

Principle 3: Framework for the comprehensive management of risks

An FMI should have a sound risk-management framework for comprehensively managing legal, credit, liquidity, operational, and other risks.

Credit and liquidity risk management

Principle 4: Credit risk

An FMI should effectively measure, monitor, and manage its credit risk from participants and from its payment, clearing, and settlement processes. An FMI should maintain sufficient financial resources to cover its credit exposure to each participant fully with a high degree of confidence. A CCP should also maintain additional financial resources to cover a wide range of potential stress scenarios that should include, but not be limited to, the default of the [one/two] participant[s] and [its/their] affiliates that would potentially cause the largest aggregate credit exposure[s] in extreme but plausible market conditions.

Principle 5: Collateral

An FMI that requires collateral to manage its or its participants' credit risk should accept collateral with low credit, liquidity, and market risk. An FMI should also set and enforce appropriately conservative haircuts and concentration limits.

Principle 6: Margin

A CCP should cover its credit exposures to its participants for all products through an effective margin system that is risk-based and regularly reviewed.

Principle 7: Liquidity risk

An FMI should effectively measure, monitor, and manage its liquidity risk. An FMI should maintain sufficient liquid resources to effect same-day and, where appropriate, intraday settlement of payment obligations with a high degree of confidence under a wide range of potential stress scenarios that should include, but not be limited to, the default of [one/two] participant[s] and [its/their] affiliates that would generate the largest aggregate liquidity need in extreme but plausible market conditions.

Settlement

Principle 8: Settlement finality

An FMI should provide clear and certain final settlement, at a minimum, by the end of the value date. Where necessary or preferable, an FMI should provide final settlement intraday or in real time.

Principle 9: Money settlements

An FMI should conduct its money settlements in central bank money where practical and available. If central bank money is not used, an FMI should minimise and strictly control the credit and liquidity risk arising from the use of commercial bank money.

Principle 10: Physical deliveries

An FMI should clearly state its obligations with respect to the delivery of physical instruments or commodities and should identify, monitor, and manage the risks associated with such physical deliveries.

Central securities depositories and exchange-of-value settlement systems

Principle 11: Central securities depositories

A CSD should have appropriate rules and procedures to help ensure the integrity of securities issues and minimise and manage the risks associated with the safekeeping and transfer of securities. A CSD should maintain securities in an immobilised or dematerialised form for their transfer by book entry.

Principle 12: Exchange-of-value settlement systems

If an FMI settles transactions that involve the settlement of two linked obligations (for example, securities or foreign exchange transactions), it should eliminate principal risk by conditioning the final settlement of one obligation upon the final settlement of the other.

Default management

Principle 13: Participant-default rules and procedures

An FMI should have effective and clearly defined rules and procedures to manage a participant default that ensure that the FMI can take timely action to contain losses and liquidity pressures, and continue to meet its obligations.

Principle 14: Segregation and portability

A CCP should have rules and procedures that enable the segregation and portability of positions and collateral belonging to customers of a participant.

General business and operational risk management

Principle 15: General business risk

An FMI should identify, monitor, and manage its general business risk and hold sufficiently liquid net assets funded by equity to cover potential general business losses so that it can continue providing services as a going concern. This amount should at all times be sufficient to ensure an orderly wind-down or reorganisation of the FMI's critical operations and services over an appropriate time period.

Principle 16: Custody and investment risk

An FMI should safeguard its assets and minimise the risk of loss or delay in access to those assets, including assets posted by its participants. An FMI's investments should be in instruments with minimal credit, market, and liquidity risks.

Principle 17: Operational risk

An FMI should identify all plausible sources of operational risk, both internal and external, and minimise their impact through the deployment of appropriate systems, controls, and procedures. Systems should ensure a high degree of security and operational reliability, and have adequate, scalable capacity. Business continuity plans should aim for timely recovery of operations and fulfilment of the FMI's obligations, including in the event of a wide-scale disruption.

Access

Principle 18: Access and participation requirements

An FMI should have objective, risk-based, and publicly disclosed criteria for participation, which permit fair and open access.

Principle 19: Tiered participation arrangements

An FMI should, to the extent practicable, identify, understand, and manage the risks to it arising from tiered participation arrangements.

Principle 20: FMI links

An FMI that establishes a link with one or more FMIs should identify, monitor, and manage link-related risks.

Efficiency

Principle 21: Efficiency and effectiveness

An FMI should be efficient and effective in meeting the requirements of its participants and the markets it serves.

Principle 22: Communication procedures and standards

An FMI should use or accommodate the relevant internationally accepted communication procedures and standards in order to facilitate efficient recording, payment, clearing, and settlement across systems.

Transparency

Principle 23: Disclosure of rules and procedures

An FMI should have clear and comprehensive rules and procedures and should provide sufficient information to enable participants to have an accurate understanding of the risks they incur by participating in the FMI. All relevant rules and key procedures should be publicly disclosed.

Principle 24: Disclosure of market data

A TR should provide timely and accurate data to relevant authorities and the public in line with their respective needs.

Responsibilities of central banks, market regulators, and other relevant authorities for financial market infrastructures

Responsibility A: Regulation, supervision, and oversight of FMIs

FMIs should be subject to appropriate and effective regulation, supervision, and oversight by a central bank, market regulator, or other relevant authority.

Responsibility B: Regulatory, supervisory, and oversight powers and resources

Central banks, market regulators, and other relevant authorities should have the powers and resources to carry out effectively their responsibilities in regulating, supervising, and overseeing FMIs.

Responsibility C: Disclosure of objectives and policies with respect to FMIs

Central banks, market regulators, and other relevant authorities should clearly define and disclose their regulatory, supervisory, and oversight policies with respect to FMIs.

Responsibility D: Application of principles for FMIs

Central banks, market regulators, and other relevant authorities should adopt, where relevant, internationally accepted principles for FMIs and apply them consistently.

Responsibility E: Cooperation with other authorities

Central banks, market regulators, and other relevant authorities should cooperate with each other, both domestically and internationally, as appropriate, in promoting the safety and efficiency of FMIs.

1.0. Introduction

1.1. Financial market infrastructures (FMIs) that facilitate the recording, clearing, and settlement of monetary and other financial transactions can strengthen the markets they serve and play a critical role in fostering financial stability; however, if not properly managed, they can pose significant risks to the financial system and be a potential source of contagion, particularly in periods of market stress. While FMIs performed well during the recent financial crisis, events highlighted important lessons for effective risk management. These lessons, along with the experience of implementing the existing international standards, led the Committee on Payment and Settlement Systems (CPSS) and the Technical Committee of the International Organization of Securities Commissions (IOSCO) to review and update the standards for FMIs.¹ This review was also conducted in support of the Financial Stability Board (FSB) initiative to strengthen core financial infrastructures and markets. All CPSS and IOSCO members intend to apply the updated standards to the relevant FMIs in their jurisdictions to the fullest extent possible.

1.2. The standards in this report harmonise and, where appropriate, strengthen the existing international standards for payment systems that are systemically important, central securities depositories (CSDs), securities settlement systems (SSSs), and central counterparties (CCPs). The revised standards also incorporate additional guidance for over-the-counter (OTC) derivatives CCPs and trade repositories (TRs). In general, these standards are expressed as broad principles in recognition that FMIs can differ in organisation, function, and design, and that there are often different ways to achieve a particular result. In some cases, the principles also incorporate a specific minimum requirement (such as in the credit, liquidity, and general business risk principles) to ensure a common base-level of risk management across FMIs and countries. In addition to standards for FMIs, the report outlines the general responsibilities of central banks, market regulators, and relevant authorities for FMIs in implementing these standards.

Background

1.3. FMIs play a critical role in the financial system and the broader economy. For the purposes of this report, an FMI refers to payment systems, CSDs, SSSs, CCPs, and TRs.² These infrastructures facilitate the clearing and settlement of monetary and other financial transactions, such as payments, securities, and derivative contracts (including derivatives contracts for commodities). While safe and efficient FMIs contribute to maintaining and promoting financial stability and economic growth, FMIs also concentrate risk. If not properly managed, FMIs can also be sources of financial shocks, such as liquidity dislocations and credit losses, or a major channel through which these shocks are transmitted across domestic and international financial markets. To address these risks, the CPSS and the Technical Committee of IOSCO have established, over the years, international risk-management standards for payment systems that are systemically important, CSDs, SSSs, and CCPs.

¹ In this report, the term "standards" is used as a generic term to cover all normative statements such as standards, principles, recommendations, and responsibilities. The use of this term is consistent with the past practice of indicating that the principles and responsibilities set out in this report are, or are expected to be, part of the body of international standards and codes recognised by the Financial Stability Board (formerly called the Financial Stability Forum) and international financial institutions.

² In general, the principles in this report are not addressed to other types of market infrastructures, such as trading exchanges, trade execution facilities, or multilateral trade-compression systems; however, relevant authorities may decide to apply some or all of these principles to them.

1.4. The CPSS, in January 2001, published the *Core principles for systemically important payment systems* (CPSIPS), which provided 10 principles for the safe and efficient design and operation of systemically important payment systems. These principles drew extensively from the *Report of the Committee on Interbank Netting Schemes of the central banks of the Group of Ten countries* (also known as the Lamfalussy Report), which was published in November 1990. The CPSIPS were followed by the *Recommendations for securities settlement systems* (RSSS), which were published jointly by the CPSS and IOSCO in November 2001. This report identified 19 recommendations for promoting the safety and efficiency of SSSs.³ The accompanying *Assessment methodology for 'Recommendations for securities settlement systems'* was subsequently published in November 2002. The CPSIPS and RSSS have been included in the 12 Key Standards for Sound Financial Systems by the FSB.

1.5. In November 2004, building upon the recommendations established in the RSSS, the CPSS and the Technical Committee of IOSCO published the *Recommendations for central counterparties* (RCCP). The RCCP provided 15 recommendations that addressed the major types of risks that CCPs face. In January 2009, the CPSS and the Technical Committee of IOSCO established a working group to provide guidance on the application of these recommendations to CCPs that clear OTC derivative products and to develop a set of considerations for TRs in designing and operating their systems. The reports of this working group, *Guidance on the application of 2004 CPSS-IOSCO recommendations for central counterparties to OTC derivatives CCPs* and *Considerations for trade repositories in OTC derivatives markets*, were issued as consultative reports in May 2010. The feedback received from the consultative process on these reports has been incorporated into this report.

1.6. In February 2010, the CPSS and the Technical Committee of IOSCO launched a comprehensive review of the three existing sets of standards for FMIs –the CPSIPS, RSSS, and RCCP– in support of the FSB's broader efforts to strengthen financial systems by ensuring that gaps in international standards are identified and addressed. The CPSS and the Technical Committee of IOSCO also identified the review as an opportunity to harmonise and reorganise the three sets of standards. The lessons from the recent financial crisis, the experience of implementing the existing international standards, and recent policy and analytical work by the CPSS, the Technical Committee of IOSCO, the Basel Committee on Banking Supervision (BCBS), and others were incorporated into the review.⁴ This report, containing a unified set of standards, is the result of that review. The standards in section 3 of this report replace the CPSIPS, RSSS, and RCCP standards insofar as they are directed specifically to FMIs. Mappings of the new standards to the CPSIPS, RSSS, and RCCP standards are provided in annexes A and B.

1.7. A full reconsideration of the marketwide recommendations from the RSSS was not undertaken as part of this review. Those recommendations remain in effect. Specifically, RSSS recommendation 2 on trade confirmation, RSSS recommendation 3 on settlement cycles, RSSS recommendation 4 on central counterparties, RSSS recommendation 5 on securities lending, RSSS recommendation 6 on central securities depositories, and RSSS recommendation 12 on protection of customers' securities remain in effect. These recommendations are provided in annex C for reference. In addition to keeping RSSS

³ The definition of the term "securities settlement system" in the RSSS is the full set of institutional arrangements for confirmation, clearance, and settlement of securities trades and safekeeping of securities. This definition differs from the definition of SSS in this report, which is more narrowly defined (see paragraph 1.12).

⁴ Recent policy and analytical work include CPSS, *Market structure developments in the clearing industry: implications for financial stability*, September 2010, and CPSS, *Strengthening repo clearing and settlement arrangements*, September 2010.

recommendations 6 and 12, this report contains focused principles on the risk management of CSDs (see principle 11) and on the segregation and portability of assets and positions held by a CCP (see principle 14). The CPSS and Technical Committee of IOSCO may conduct a full review of the marketwide standards in the future.

FMI: definition, organisation, and function

1.8. For the purposes of this report, an FMI is defined as a multilateral system among participating financial institutions, including the operator of the system, used for the purposes of recording, clearing, or settling payments, securities, derivatives, or other financial transactions.⁵ FMIs typically establish a set of common rules and procedures for all participants, a technical infrastructure, and a specialised risk-management framework appropriate to the risks they incur. FMIs provide participants with centralised recording, clearing, netting, and settlement of financial transactions among themselves or between each of them and a central party to allow for greater efficiency and reduced costs and risks. Through the centralisation of specific activities, FMIs also allow participants to manage their risks more efficiently and effectively, and, in some instances, eliminate certain risks. FMIs can also promote increased transparency in particular markets. Some FMIs are critical to helping central banks conduct monetary policy and maintain financial stability.⁶

1.9. FMIs can differ significantly in organisation, function, and design. FMIs can be legally organised in a variety of forms, including associations of financial institutions, non-bank clearing corporations, and specialised banking organisations. FMIs may be owned and operated by a central bank or by the private sector. FMIs may also operate as for-profit or not-for-profit entities. Depending on organisational form, FMIs can be subject to different licensing and regulatory schemes within and across jurisdictions. For example, bank and non-bank FMIs are often regulated differently. For the purposes of this report, the functional definition of an FMI includes five key types of FMIs: payment systems, CSDs, SSSs, CCPs, and TRs. There can be significant variation in design among FMIs with the same function. For example, some FMIs use real-time settlement, while others may use deferred settlement. Some FMIs settle individual transactions while others settle batches of transactions.

Payment systems

1.10. A payment system is a set of instruments, procedures, and rules for the transfer of funds between or among participants; the system includes the participants and the entity operating the arrangement. Payment systems are typically based on an agreement between or among participants and the operator, and the transfer of funds is effected using an agreed-upon operational infrastructure. A payment system is generally categorised as either a retail payment system or a large-value payment system (LVPS). A retail payment system is a funds transfer system that typically handles a large volume of relatively low-value payments in such forms as cheques, credit transfers, direct debits, and debit card transactions. Many retail payment systems are operated either by the private sector or the

⁵ The definition of FMIs excludes bilateral relationships between financial institutions and their customers, such as traditional correspondent banking.

⁶ Typically, the effective implementation of monetary policy depends on the orderly settlement of transactions and the efficient distribution of liquidity. For example, many central banks implement monetary policy by influencing short-term interest rates through the purchase and sale of certain financial instruments, such as government securities or foreign exchange, or through collateralised lending. It is important that FMIs are safe and efficient and allow for the reliable transfer of funds and securities between the central bank, its counterparties, and the other participants in the financial system so that the effect of monetary policy transactions can be spread widely and quickly throughout the economy.

public sector, using a multilateral deferred net settlement (DNS) or a real-time gross settlement (RTGS) mechanism.⁷ An LVPS is a funds transfer system that typically handles large-value and high-priority payments. Many LVPSs are operated by central banks, using an RTGS or equivalent mechanism.

Central securities depositories

1.11. A central securities depository holds securities accounts and, in many countries, operates a securities settlement system (as defined in paragraph 1.12). A CSD also provides central safekeeping and asset services, which may include the administration of corporate actions and redemptions, and plays an important role in helping to ensure the integrity of securities issues (that is, securities are not accidentally or fraudulently created or destroyed or their details changed). A CSD can hold securities either in physical form (but immobilised) or in dematerialised form (that is, they exist only as electronic records). The precise activities of a CSD vary based on jurisdiction and market practices. For example, the activities of a CSD may vary depending on whether it operates in a jurisdiction with a direct or indirect holding arrangement or a combination of both.⁸ A CSD may maintain the definitive record of legal ownership for a security; in some cases, however, a separate securities registrar will serve this notary function.⁹

Securities settlement systems

1.12. A securities settlement system enables securities to be transferred and settled by book entry according to a set of predetermined multilateral rules. Such systems allow transfers of securities either free of payment or against payment. When transfer is against payment, many systems provide delivery versus payment (DvP), where delivery of the security occurs if and only if payment occurs. An SSS may be organised to provide additional securities clearing and settlement functions, such as the confirmation of trade and settlement instructions. The definition of an SSS in this report is more narrow than the one used in the RSSS, which defined an SSS broadly to include the full set of institutional arrangements for confirmation, clearance, and settlement of securities trades, and safekeeping of securities across a securities market. For example, the RSSS definition for SSSs included CSDs and CCPs, as well as commercial bank functions involving securities transfers. In this report, CSDs and CCPs are treated as separate types of FMIs. As noted above, in many countries, CSDs also operate an SSS.

Central counterparties

1.13. A central counterparty interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer and thereby ensuring the performance of open contracts.¹⁰ A CCP becomes

⁷ In some countries, these retail payment systems may be systemically important systems.

⁸ In a direct holding system, each beneficial or direct owner of the security is known to the CSD or the issuer. In some countries, the use of direct holding systems is required by law. Alternatively, an indirect holding system employs a multi-tiered arrangement for the custody and transfer of ownership of securities (or the transfer of similar interests therein) in which investors are identified only at the level of their custodian.

⁹ A securities registrar is an entity that provides the service of preparing and recording accurate, current, and complete securities registers for securities issuers.

¹⁰ In markets where a CCP does not exist, a guarantee arrangement may provide market participants with some degree of protection against losses from counterparty defaults. Such arrangements typically are organised and managed by the CSD of the market or by some other market operator. A guarantee typically is viewed as desirable or even necessary where market rules or other features make it practically impossible for market

counterparty to trades with market participants through novation, an open-offer system, or through an analogous legally binding arrangement.¹¹ CCPs have the potential to reduce risks significantly to participants through the multilateral netting of trades and by imposing more-effective risk controls on all participants. For example, CCPs typically require the posting of margin (collateral) by participants to cover current and future exposures, as well as the sharing of residual risk by direct participants. As a result of their potential to reduce risks to participants, CCPs also can reduce systemic risk in the markets they serve. The effectiveness of a CCP's risk controls and the adequacy of its financial resources are critical to achieving these risk-reduction benefits.

Trade repositories

1.14. A trade repository is an entity that maintains a centralised electronic record (database) of transaction data.¹² TRs have emerged as a new type of FMI and have recently grown in importance, particularly in the OTC derivatives market. By centralising the collection, storage, and dissemination of data, a well-designed TR that operates with effective risk controls can serve an important role in enhancing the transparency of information to relevant authorities and the public, promoting financial stability, and supporting the detection and prevention of market abuse. An important function is to provide information that supports risk reduction, operational efficiency, and cost savings for both individual entities and the market as a whole. Such entities may include the principals to a trade, their agents, CCPs, and other service providers offering complementary services, including central settlement of payment obligations, electronic novation and affirmation, portfolio compression and reconciliation, and collateral management.¹³ Since the data maintained by a TR may be used by a number of stakeholders, the continuous availability, reliability, and accuracy of such data is critical.

participants to manage their counterparty credit risks bilaterally. Guarantee arrangements vary greatly from simple insurance-based schemes to more-sophisticated structures comparable to a CCP.

¹¹ Through novation, the original contract between the buyer and seller is extinguished and replaced by two new contracts, one between the CCP and the buyer, and the other between the CCP and the seller. In an open-offer system, a CCP is automatically and immediately interposed in a transaction at the moment the buyer and seller agree on the terms.

¹² The functions of a TR, where permitted by applicable law, may also be performed by a payment system, CSD, or CCP in addition to its core functions. A TR may also provide or support ancillary services such as the management of trade life-cycle events and downstream trade-processing services based on the records it maintains.

¹³ For some TRs, participants may agree that an electronic transaction record maintained in the TR provides the official economic details of a legally binding contract. This enables trade details to be used for providing additional services.

Box 1

Public policy benefits of trade repositories

One of the primary public policy benefits of a TR, which stems from the centralisation and quality of the data that a TR maintains, is improved market transparency and the provision of this data to relevant authorities and the public in line with their respective information needs. Timely and reliable access to data stored in a TR has the potential to improve significantly the ability of relevant authorities and the public to identify and evaluate the potential risks posed to the broader financial system (see principle 24 on disclosure of market data). Relevant authorities, in particular, should have effective and practical access to data stored in a TR, including participant level data, which they require to carry out their respective regulatory mandates and legal responsibilities.

A TR may serve a number of stakeholders that depend on having effective access to TR services, both to submit and retrieve data. In addition to relevant authorities and the public, other stakeholders can include exchanges, electronic trading venues, confirmation or matching platforms, and third-party service providers that utilise TR data to offer complementary services. It is essential, therefore, for a TR to design its access policies and terms of use in a manner that supports fair and open access to its services and data (see principle 18 on access and participation requirements). Another important benefit of a TR is its promotion of standardisation through the provision of a common technical platform that requires consistency in data formats and representations. The result is a centralised store of transaction data with greater usefulness and reliability than when the data are dispersed.

Central banks, market regulators, and other relevant authorities for TRs have a responsibility to mutually support each other's access to data in which they have a material interest as part of their regulatory, supervisory, and oversight responsibilities, consistent with the G20 Declaration at the 2010 Toronto Summit.¹⁴ As market infrastructures continue to evolve, TRs may develop for a variety of products and asset classes both within and across particular jurisdictions, and cooperation among authorities will become increasingly important (see responsibility E on cooperation with other authorities). Efforts should be made to remove any legal obstacles or restrictions to enable appropriate, effective, and practical access to data by relevant authorities, provided such authorities are subject to appropriate confidential safeguards.

Public policy objectives: safety and efficiency

1.15. The main public policy objectives of the CPSS and the Technical Committee of IOSCO in setting forth principles for FMIs are to enhance safety and efficiency in payment, clearing, and settlement arrangements, and more broadly, to limit systemic risk and foster transparency and financial stability.¹⁵ Poorly designed and operated FMIs can contribute to and exacerbate systemic crises if the risks of these systems are not adequately managed,

¹⁴ The Declaration of the G20, 2010 Toronto Summit, annex II, paragraph 25, provides: "We pledged to work in a coordinated manner to accelerate the implementation of over-the-counter (OTC) derivatives regulation and supervision and to increase transparency and standardization. We reaffirm our commitment to trade all standardized OTC derivatives contracts on exchanges or electronic trading platforms, where appropriate, and clear through central counterparties (CCPs) by end-2012 at the latest. OTC derivative contracts should be reported to trade repositories (TRs). We will work toward the establishment of CCPs and TRs in line with global standards and ensure that national regulators and supervisors have access to all relevant information." The complete declaration is available at <http://www.g20.org>.

¹⁵ These objectives are consistent with the public policy objectives of previous reports by the CPSS and the Technical Committee of IOSCO. Other objectives, which include anti-money laundering, antiterrorist financing, data privacy, promotion of competition policy, and specific types of investor or consumer protection, can play important roles in the design of such systems, but these issues are generally beyond the scope of this and previous reports.

with the result that financial shocks are passed from one participant or system to others. The effects of such a disruption could extend well beyond the FMIs and their participants, threatening the stability of domestic and international financial markets and the broader economy. In contrast, robust FMIs have been shown to be an important source of strength in financial markets, giving market participants the confidence to fulfil their settlement obligations on time, even in periods of market stress. In relation to CCPs, the objectives of safety and efficiency are even more pertinent because national authorities have required or proposed the mandatory use of centralised clearing in an increasing number of financial markets.

Achieving the public policy objectives

1.16. Market forces alone will not necessarily achieve fully the public policy objectives of safety and efficiency because FMIs and their participants do not necessarily bear all the risks and costs associated with their payment, clearing, and settlement activities. Moreover, the institutional structure of the FMI may not provide strong incentives or mechanisms for safe and efficient design and operation, fair and open access, or the protection of participant and customer assets. In addition, participants may not consider the full impact of their actions on other participants, such as the potential costs of delaying payments or settlements. Overall, an FMI and its participants may generate significant negative externalities for the entire financial system and real economy if they do not adequately manage their risks. In addition, factors such as economies of scale, barriers to entry, or even legal mandates, may limit competition and confer market power on an FMI, which could lead to lower levels of service, higher prices, or under-investment in risk-management systems. Caution is needed, however, so that excessive competition between FMIs does not lead to a competitive lowering of risk standards.

Safety as a public policy objective

1.17. To ensure their safety and promote financial stability more broadly, FMIs should robustly manage their risks. FMIs should first identify and understand the types of risks that arise in or are transmitted by the FMI and then determine the sources of these risks. Once these risks are properly assessed, appropriate and effective mechanisms should be developed to monitor and manage them. The risks, described in section 2 of the report, include (but are not limited to) legal, credit, liquidity, general business, custody and investment, and operational risks. The principles for FMIs in this report provide guidance to FMIs and authorities on the identification, monitoring, and management of these risks.

Efficiency as a public policy objective

1.18. An FMI should be not only safe, but also efficient. Efficiency refers generally to the use of resources by FMIs and their participants in performing their functions. Efficient FMIs contribute to well-functioning financial markets. An FMI that operates inefficiently may distort financial activity and the market structure, affecting not only its participants, but also their customers. These distortions may lead to lower aggregate levels of efficiency and safety, as well as increased risks within the broader financial system. In making choices about design and operation, FMIs ultimately should not let other considerations take precedence over the establishment of prudent risk-management practices.

Scope of the principles for FMIs

1.19. The principles in this report provide broad but flexible guidance for addressing risks and efficiency in FMIs. With a few exceptions, the principles do not prescribe a specific tool or arrangement to achieve their requirements and contemplate different means to satisfy a particular principle. Where appropriate, some principles establish a minimum requirement to

help contain risks and provide for a level playing field. The principles are designed to be applied holistically because of the significant interaction between principles; principles should be applied as a set and not as stand-alone principles. Some principles build upon others and some complement each other.¹⁶ In other instances, the principles reference an important, common theme.¹⁷ A few principles, such as governance and operational risk, include references to best practices for FMIs, which may also evolve and improve over time. FMIs and their authorities should consider such best practices, as appropriate. In addition, authorities have the flexibility to consider imposing higher requirements for FMIs in their jurisdiction either on the basis of specific risks posed by an FMI or as a general policy.

General applicability of the principles

1.20. The principles in this report are broadly designed to apply to all systemically important payment systems, CSDs, SSSs, CCPs, and TRs. FMIs that are determined by national authorities to be systemically important are expected to meet these principles. A payment system is systemically important if it has the potential to trigger or transmit systemic disruptions; this includes, among other things, systems that are the sole payment system in a country or the principal system in terms of the aggregate value of payments; systems that mainly handle time-critical, high-value payments; and systems that settle payments used to effect settlement in other systemically important FMIs.¹⁸ The presumption is that all CSDs, SSSs, CCPs, and TRs are systemically important because of their critical roles in the markets they serve. Authorities should disclose which CSDs, SSSs, CCPs, and TRs they do not regard as systemically important and to which they do not intend to apply the principles and provide a comprehensive and clear rationale. Conversely, authorities may disclose the criteria used to identify which FMIs are considered as systemically important and may disclose which FMIs they regard as systemically important against these criteria. These principles are designed to apply to domestic, cross-border, and multicurrency FMIs. All FMIs are encouraged to meet these principles.

Specific applicability of principles to different types of FMIs

1.21. Most principles in this report are applicable to all types of FMIs covered by the report. However, a few principles are only relevant to specific types of FMIs (see table 1 for general applicability of principles to specific types of FMIs and annex D for applicability of key considerations to specific types of FMIs). For example, because TRs do not face credit or liquidity risks, the principles on credit and liquidity risks are not applicable to them, while principle 11 only applies to CSDs and principle 12 only applies to exchange-of-value settlement systems. In addition, where a particular principle applies in a specific way to a particular type of FMI, the report tries to provide appropriate direction. For example, principle 4 on credit risk applies to all FMIs, but also provides specific direction to CCPs. Also, annex E provides additional guidance for OTC derivatives CCPs.

¹⁶ For example, in managing financial risk, FMIs should, among others, refer to the principles on the framework for the comprehensive management of risk, credit risk, collateral, margin, liquidity risk, money settlement, and exchange-of-value settlement systems. Other relevant principles include legal basis, governance, participant-default rules and procedures, general business risk, custody and investment risk, and operational risk. Failure to apply all of these principles may result in less-than-robust overall risk management by an FMI.

¹⁷ For example, the roles of governance and transparency in managing risk and supporting sound public policy are addressed in principles 2 and 23, respectively. Because of the general importance and relevance of governance and transparency, they are also referred to in several other principles.

¹⁸ These criteria for systemic importance mirror those outlined in the CPSIPS.

1.22. In general, the principles are applicable to FMIs operated by central banks, as well as those operated by the private sector. Central banks should apply the same standards as are applicable to similar private-sector systems. However, in certain cases, central banks also have separate public policy objectives and responsibilities for monetary and liquidity policies that may take precedence.

Table 1
General applicability of principles to specific types of FMIs

Principle	Payment systems	CSDs and SSSs*	CCPs	TRs
1. Legal basis	•	•	•	•
2. Governance	•	•	•	•
3. Framework for the comprehensive management of risks	•	•	•	•
4. Credit risk	•	•	•	
5. Collateral	•	•	•	
6. Margin			•	
7. Liquidity risk	•	•	•	
8. Settlement finality	•	•	•	
9. Money settlements	•	•	•	
10. Physical deliveries		•	•	
11. Central securities depositories		•		
12. Exchange-of-value settlement systems	•	•	•	
13. Participant-default procedures	•	•	•	
14. Segregation and portability			•	
15. General business risk	•	•	•	•
16. Custody and investment risk	•	•	•	
17. Operational risk	•	•	•	•
18. Access and participation requirements	•	•	•	•
19. Tiered participation arrangements	•	•	•	•
20. FMI links	•	•	•	•
21. Efficiency and effectiveness	•	•	•	•
22. Communication procedures and standards	•	•	•	•
23. Disclosure of rules and key procedures	•	•	•	•
24. Disclosure of market data				•

* The applicability of certain principles for CSDs and SSSs will vary with the design of the FMI.

FMI resolution

1.23. The focus of this report and its principles is to ensure that FMIs operate as smoothly as possible in normal circumstances and in times of market stress. While the resolution or

insolvency of an FMI is noted under several principles, including the legal basis, credit risk, general business risk, central securities depositories, and segregation and portability principles, this report does not directly address issues relating to the design and implementation of resolution and insolvency regimes for FMIs. This subject is beyond the scope of this report. Instead, the report focuses on preventing the illiquidity and insolvency of an FMI in order to prevent and control the systemic risks associated with such events. Because resolution and insolvency are important and complex subjects that affect a number of the types of risks FMIs, their participants, and participants' customers incur in the clearing and settlement process, national authorities may need to give further consideration to relevant resolution and insolvency issues in their jurisdictions.

Indirect participation

1.24. Issues concerning indirect participants are relevant for the smooth functioning of FMIs. Indirect participants potentially present risks to FMIs, including through the transactions they conduct with direct participants. This can be particularly relevant for systems where there is a high degree of tiering. In addition, if indirect participants are requested by direct participants to support the risk-management arrangements of an FMI, it is of utmost importance that their assets are adequately protected and that there is a fair distribution of costs associated with risk management between direct and indirect participants. This is especially true for OTC derivatives contracts subject to mandatory clearing for indirect participants. Finally, in some cases, indirect participants are institutions established in jurisdictions other than where the FMI is established. In these cases, it is of the utmost importance to provide fair and open access. These indirect participants may not even have local FMIs, such as CCPs, that support important markets (see also paragraph 1.26 on interoperability).

1.25. There is no common definition of "indirect participant" given the range of potential types of indirect participants and tiering structures. In many cases, the FMI has no contractual or other relationship with an indirect participant, and it is the responsibility of the relevant direct participant to ensure that the FMI is not adversely affected by the indirect participant's behaviour. Principle 19 provides guidance on how an FMI should address risks to it from tiered participation arrangements. Additional issues relating to indirect participants are addressed in (a) principle 1 on legal basis, (b) principle 2 on governance, (c) principle 3 on the framework for the comprehensive management of risks, (d) principle 13 on participant-default rules and procedures, (e) principle 14 on segregation and portability, (f) principle 18 on access and participation requirements, and (g) principle 23 on disclosure of rules and key procedures.

Interoperability

1.26. Interoperability is addressed in this report but is not the focus of any specific principle. Rather, interoperability is addressed in (a) principle 2 on governance, which states that FMIs should consider the interests of the broader markets; (b) principle 3 on the framework for the comprehensive management of risks, which states that FMIs should consider the relevant risks that they bear from and pose to other entities; (c) principle 18 on access and participation requirements, which states that FMIs should have fair and open access; (d) principle 20 on links, which states that linked FMIs should identify, monitor, and manage link-related risks; (e) principle 21 on efficiency and effectiveness, which states that FMIs should be designed to meet the needs of their participants; and (f) principle 22 on communication procedures and standards, which states that FMIs should use, or at a minimum accommodate, internationally accepted communication procedures and standards. The combination of these principles should achieve a strong and balanced approach to interoperability.

Implementation and use of the principles and responsibilities

1.27. FMIs that are subject to these principles should apply them on an ongoing basis in the operation of their business. This includes when reviewing their performance, assessing or proposing new services, or proposing changes to risk controls. FMIs should communicate the outcome of their findings as part of their regular dialogue with relevant authorities. FMIs should also conduct more formal periodic self-assessments of compliance with the principles, where this is consistent with national practice. The relevant authorities, consistent with their respective responsibilities for regulation, supervision, and oversight of an FMI, are expected to perform their own assessments of the FMI. To the fullest extent permissible under national statutory regimes, relevant authorities should seek to incorporate these principles into their respective activities. If an FMI is not in compliance with these principles, actions should be taken to promote compliance. The FMI's self-assessment, or the summary of the authorities' assessments, should be publicly disclosed, where consistent with national law and practice (see also principle 23 on disclosure of rules and key procedures and responsibility B on regulatory, supervisory, and oversight powers and resources).

1.28. Central banks, market regulators, and other relevant authorities for FMIs should accept and be guided by the responsibilities in section 4 of this report, consistent with relevant national law. While each individual FMI is fundamentally responsible for complying with these principles, effective regulation, supervision, and oversight are necessary to ensure compliance and induce change. Section 4 encourages authorities to pursue effective regulation, supervision, and oversight; regulatory transparency; and the adoption and consistent application of the principles. Authorities should cooperate with each other both domestically and internationally to minimise their potential duplication of effort and reduce the burden on the FMI and the relevant authorities. These responsibilities are consistent with international best practices. Other CPSS and IOSCO guidance to authorities on the regulation, supervision, and oversight of FMIs also may be relevant.

1.29. International financial institutions, such as the International Monetary Fund and the World Bank, may also use these principles in promoting the stability of the financial sector when carrying out assessment programmes for FMIs and related arrangements and in providing technical assistance to particular countries.

Organisation of the report

1.30. This report has four sections. Following this introduction (section 1), the report provides an overview of the key risks in FMIs (section 2). The principles for FMIs are then discussed in detail (section 3) followed by the responsibilities of central banks, market regulators, and other relevant authorities for FMIs (section 4). For each standard, there is a bulleted list of key considerations that further explains the headline standard. An accompanying explanatory note discusses the objective and rationale of the standard and provides guidance on how the standard can be implemented. Where appropriate, annexes provide additional information or guidance. In addition, the final report, when published, will be supplemented by key questions for each principle and responsibility, an assessment methodology, and associated requirements with respect to the preparation and public disclosure of FMI self-assessments and related information. A separately published compendium is planned that will provide more-detailed notes and additional information on specific topics.

2.0. Overview of key risks in financial market infrastructures

2.1. FMI are generally sophisticated multilateral systems that handle significant transaction volumes and sizable monetary values. Through the centralisation of certain activities, FMIs allow participants to manage their risks more effectively and efficiently, and, in some instances, eliminate certain risks. By performing centralised activities, however, FMIs concentrate risks and create interdependencies between and among FMIs and financial institutions. In addition to discussing systemic risk, this section of the report provides an overview of specific key risks faced by FMIs. These include legal, credit, liquidity, general business, custody and investment, and operational risks. Whether an FMI, its participants, or both face a particular form of risk, as well as the degree of risk, will depend on the type of FMI and its design.

Systemic risk

2.2. Safe and efficient FMIs mitigate systemic risk. FMIs may themselves face systemic risk, however, since the inability of one or more participants to perform as expected could cause other participants to be unable to meet their obligations when due. In such circumstances, a variety of “knock-on” effects are possible, and an FMI’s inability to complete settlement could have significant adverse effects on the markets it serves and the broader economy. These adverse effects, for example, could arise from unwinding or reversing payments or deliveries; delaying the settlement or close out of guaranteed transactions; or immediately liquidating collateral, margin, or other assets at “fire sale” prices. If an FMI were to take such steps, its participants could suddenly be faced with significant and unexpected open positions and credit exposures that might be extremely difficult to manage or cover at the time. This, in turn, might lead to further disruptions in the financial system and undermine public confidence in the safety, soundness, and reliability of the financial infrastructure.

2.3. More broadly, FMIs may be linked to or dependent upon one another, may have common participants, and may serve interconnected institutions and markets. Complex interdependencies may be a normal part of an FMI’s structure or operations. In many cases, interdependencies have facilitated significant improvements in the safety and efficiency of FMIs’ activities and processes. Interdependencies, however, can also present an important source of systemic risk.¹⁹ For example, these interdependencies raise the potential for disruptions to spread quickly and widely across markets. If an FMI depends on the smooth functioning of one or more FMIs for its payment, clearing, and settlement processes, a disruption in one FMI can disrupt other FMIs simultaneously. These interdependencies, consequently, can transmit disruptions beyond a specific FMI and its participants and affect the broader economy.

Legal risk

2.4. For the purposes of this report, legal risk is the risk of the unexpected application of a law or regulation, usually resulting in a loss. Legal risk can also arise if the application of relevant laws and regulations is uncertain. For example, legal risk encompasses the risk that a counterparty faces from an unexpected application of a law that renders contracts illegal or unenforceable. Legal risk also includes the risk of loss resulting from a delay in the recovery of financial assets or a freezing of positions. In cross-border as well as some national contexts, different bodies of law can apply to a single transaction, activity, or participant. In such instances, an FMI and its participants may face losses resulting from the unexpected

¹⁹ See also CPSS, *The interdependencies of payment and settlement systems*, June 2008.

application of a law, or the application of a law different than specified in a contract, by a court in a relevant jurisdiction.

Credit risk

2.5. FMIs and their participants may face various types of credit risk, which is the risk that a counterparty, whether a participant or other entity, will be unable to meet fully its financial obligations when due, or at any time in the future. FMIs and their participants may face replacement-cost risk (often associated with pre-settlement risk) and principal risk (often associated with settlement risk). Replacement-cost risk is the risk of loss of unrealised gains on unsettled transactions with a counterparty (for example, the unsettled transactions of a CCP). The resulting exposure is the cost of replacing the original transaction at current market prices. Principal risk is the risk that a counterparty will lose the full value involved in a transaction, for example, the risk that a seller of a financial asset will irrevocably deliver the asset, but not receive payment. Credit risk can also arise from other sources, such as the failure of settlement banks, custodians, or linked FMIs to meet their financial obligations.

Liquidity risk

2.6. FMIs and their participants may face liquidity risk, which is the risk that a counterparty, whether a participant or other entity, will have insufficient funds to meet its financial obligations as and when expected, although it may be able to do so in the future. Liquidity risk includes the risk that a seller of an asset will not receive payment when due, and the seller may have to borrow or liquidate assets to complete other payments. It also includes the risk that a buyer of an asset will not receive delivery when due, and the buyer may have to borrow the asset in order to complete its own delivery obligation. Thus, both parties to a financial transaction are potentially exposed to liquidity risk on the settlement date. Liquidity problems have the potential to create systemic problems, particularly if they occur when markets are closed or illiquid or when asset prices are changing rapidly, or if they create concerns about solvency. Liquidity risk can also arise from other sources, such as the failure or the inability of settlement banks, nostro agents, custodian banks, liquidity providers, and linked FMIs to perform as expected.

General business risk

2.7. In addition, FMIs face general business risks, which are the risks related to the administration and operation of an FMI as a business enterprise, excluding those related to the default of a participant or another entity, such as a settlement bank, global custodian, or another FMI. General business risk refers to any potential impairment of the financial condition (as a business concern) of an FMI due to declines in its revenues or growth in its expenses, resulting in expenses exceeding revenues and a loss that must be charged against capital. Such impairment may be a result of adverse reputational effects, poor execution of business strategy, ineffective response to competition, losses in other business lines of the FMI or its parent, or other business factors. Business-related losses also may arise from risks covered by other principles, for example, legal or operational risk. A failure to manage general business risk could result in a disruption of an FMI's business operations.

Custody and investment risk

2.8. FMIs may also face custody and investment risks on the assets that they own and those they hold on behalf of their participants. Custody risk is the risk of loss on assets held in custody in the event of a custodian's (or subcustodian's) insolvency, negligence, fraud, poor administration, or inadequate recordkeeping. Investment risk is the risk of loss when an

FMI invests its own resources, or resources such as collateral posted by its participants, in instruments with market, credit, or liquidity risks. These risks can be relevant not only to the costs of holding and investing resources but also to the safety and reliability of an FMI's risk-management systems. The failure of an FMI to properly safeguard its assets could result in credit, liquidity, and reputational problems for the FMI itself.

Operational risk

2.9. All FMIs face operational risk, which is the risk that deficiencies in information systems or internal processes, human errors, management failures, or disruptions from external events will result in the reduction, deterioration, or breakdown of services provided by an FMI. These may lead to consequent delays, losses, liquidity problems, and in some cases systemic risks. Operational deficiencies also can reduce the effectiveness of measures that FMIs may take to manage risk, for example, by impairing their ability to complete settlement, or by hampering their ability to monitor and manage their credit exposures. In the case of TRs, operational deficiencies could limit the usefulness of the transaction data maintained by a TR. Possible operational failures include errors or delays in processing, system outages, insufficient capacity, fraud, and data loss and leakage. Operational risk can stem from both internal and external sources. For example, participants can generate operational risk for FMIs and other participants, which could result in liquidity or operational problems within the broader financial system.

Box 2

Risk considerations for trade repositories

TRs face risks that, if not controlled effectively, could have a material negative impact on the markets they serve. The primary risk to a TR is operational risk, although other risks may hamper its safe and efficient functioning. As part of its core recordkeeping function, a TR must ensure that the data it maintains is accurate and current in order to serve as a reliable central data source. The continuous availability of data stored in a TR is also essential. Specific operational risks that a TR must manage include risks to data integrity, data security, and business continuity. Because the data recorded by a TR may be utilised as an input by the TR's participants, relevant authorities, and other parties, including other FMIs and service providers, all trade data collected, stored, and disseminated by a TR should be protected from corruption, loss, leakage, unauthorised access, and other processing risks. In addition, a TR may be part of a network linking various entities (such as CCPs, dealers, custodians, and service providers) and could transmit risk or cause processing delays to such linked entities in the event of an operational disruption.

3.0. Principles for financial market infrastructures

General organisation

The foundation of an FMI's risk-management framework includes its authority, structure, rights, and responsibilities. The following set of principles provides guidance on (a) the legal basis for the FMI's activities, (b) the governance structure of the FMI, and (c) the framework for the comprehensive management of risks, to help establish a strong foundation for the risk management of an FMI.

Principle 1: Legal basis

An FMI should have a well-founded, clear, transparent, and enforceable legal basis for each aspect of its activities in all relevant jurisdictions.

Key considerations

1. *The legal basis should provide a high degree of certainty for each aspect of an FMI's activities in all relevant jurisdictions.*
2. *An FMI should have rules, procedures, and contracts that are clear, understandable, and consistent with relevant laws and regulations.*
3. *An FMI should be able to articulate the legal basis for its activities to relevant authorities, participants, and, where relevant, participants' customers, in a clear and understandable way.*
4. *An FMI should have rules, procedures, and contracts that are enforceable in all relevant jurisdictions, even when a participant defaults or becomes insolvent. There should be a high degree of certainty that actions taken under such rules and procedures will not be stayed, voided, or reversed.*
5. *An FMI conducting business in multiple jurisdictions should identify and mitigate the risks arising from any potential conflicts of laws across jurisdictions.*

Explanatory note

3.1.1. A robust legal basis for an FMI's activities in all relevant jurisdictions is critical to an FMI's overall soundness. The legal basis defines, or provides the foundation for relevant parties to define, the rights and obligations of the FMI, its participants, and, where relevant, participants' customers. Most risk-management mechanisms are based on assumptions about the manner and time at which these rights and obligations arise through the FMI. Therefore, if risk management is to be sound and effective, the enforceability of rights and obligations relating to an FMI and its risk management should be established with a high degree of certainty. If the legal basis for an FMI's activities and operations is inadequate, uncertain, or opaque, then the FMI, its participants, and their customers may face unintended, uncertain, or unmanageable credit or liquidity risks, which may also create or amplify systemic risks.

Legal basis

3.1.2. The legal basis should provide a high degree of certainty for each aspect of an FMI's activities in all relevant jurisdictions. The legal basis consists of the legal framework and the FMI's rules, procedures, and contracts. The legal framework includes general laws and regulations that govern, among other things, property, contract, insolvency, corporations, banking, secured interests, and liability. In some cases, competition, consumer, and investor

protection laws and regulations may also be relevant. Specific laws and regulations governing the rights and interests in financial instruments, settlement finality, and netting are important. Other specific laws and regulations, such as those governing the immobilisation and dematerialisation of securities; arrangements for DvP, PvP, or DvD; collateral arrangements (including margin arrangements); and default procedures may be applicable, depending on the particular FMI. An FMI should establish rules, procedures, and contracts that are consistent with the legal framework and provide a high degree of legal certainty. In establishing its rules, procedures, and contracts, an FMI also should consider relevant industry standards and market protocols and specify when such practices have been incorporated into the documentation governing the rights and obligations of the FMI, its participants, or other parties, as appropriate. The FMI's rules, procedures, and contracts should be clear, understandable, and consistent with relevant laws and regulations.

3.1.3. A TR's rules, procedures, and contracts should be clear as to the legal status of the transaction records that it stores. Most TRs store transaction data that do not represent legally enforceable trade records. For some other TRs, participants may agree that the electronic transaction record maintained in the TR provides the official economic details of a legally binding contract, which enables trade details to be used for downstream processing. A TR should identify and mitigate any legal risks associated with any such ancillary services that it may provide. Further, the legal basis should also set out the rules and procedures for providing access and disclosing data to participants, relevant authorities, and the public to meet their respective information needs, as well as data protection and confidentiality issues (see also principle 24 on disclosure of market data).

3.1.4. An FMI should be able to articulate its legal basis to relevant authorities, participants, and, where relevant, participants' customers, in a clear and understandable way. One recommended approach to articulating the legal basis for each aspect of an FMI's activities is to obtain well-reasoned and independent legal opinions or analyses. A legal opinion or analysis, among other things, should identify and, where necessary, interpret the laws and regulations applicable to an FMI's operations and services. In addition, an FMI should seek to ensure that its activities are consistent with the legal basis in all relevant jurisdictions. These jurisdictions could include (a) those where an FMI is conducting business (including through linked FMIs); (b) those where its participants are incorporated, located, or otherwise conducting business for the purposes of participation; (c) those where collateral is located or held; and (d) those indicated by any choice-of-law provisions in relevant contracts.

Rights and interests

3.1.5. The legal basis should clearly define the rights and interests of an FMI, its participants, and, where relevant, participants' customers in the financial instruments, such as cash and securities, or other relevant assets held in custody, directly or indirectly, by the FMI. The legal basis should fully protect from the insolvency of relevant parties and other relevant risks a participant's assets held in custody by the FMI, and where appropriate, a participant's customer assets held by the FMI, as well as an FMI's assets held at a custodian or linked FMI. In particular, consistent with principle 11 on CSDs and principle 14 on segregation and portability, the legal basis should protect the assets and positions of a participant's customers in a CSD and CCP in order to achieve fully the benefits of segregation and portability. In addition, the legal basis should provide certainty of rights and interests covering, where applicable, an FMI's interests in and rights to use and dispose of collateral, to transfer ownership rights or property interests, and to make and to receive payments, notwithstanding the bankruptcy or insolvency of its participants, participants'

customers, or custodian bank.²⁰ Also, the claims of the FMI or its participants against collateral posted to the FMI by a participant should have priority over the claims of third-party creditors. For TRs, the legal basis also should define specifically the rights and interests of participants, and other relevant stakeholders with respect to the data stored in the TR's systems. Where the existing law restricts a TR's ability to provide data to relevant authorities, the TR should communicate such restrictions to these authorities so that authorities can take appropriate action.

Settlement finality

3.1.6. The legal basis should also address when settlement finality occurs in an FMI in order to define when key financial risks are transferred in the system, including the point at which transactions are irrevocable. Settlement finality is an important building block for risk-management systems (see also principle 8 on settlement finality). An FMI should consider, in particular, the actions that would need to be taken in the event of the insolvency of a participant. A key question is whether transactions of an insolvent participant would be honoured as final, or could be considered void or voidable by liquidators and relevant authorities. In some countries, for example, so-called "zero-hour rules" in insolvency law can have the effect of reversing a payment that appears to have been settled in a payment system.²¹ As this can lead to credit and liquidity risks, zero-hour rules should be eliminated. An FMI also should consider the legal basis for the external settlement mechanisms it uses, such as funds transfer or securities transfer systems. The laws of the relevant jurisdictions should support the provisions of the FMI's legal agreements with its participants and settlement banks relating to finality.

Netting arrangements

3.1.7. If an FMI has netting arrangements, the enforceability of the netting arrangement should have a sound and transparent legal basis.²² In general, netting offsets obligations between or among participants in the netting arrangement, which reduces the number and value of payments or deliveries needed to settle a set of transactions. Netting can reduce potential losses in the event of a participant default and, possibly, even the probability of a default.²³ Netting arrangements should be explicitly recognised and supported under the law and enforceable against an FMI and an FMI's failed participants in bankruptcy. Without such

²⁰ Collateral arrangements may involve either a pledge or a title transfer, including transfer of full ownership. If an FMI accepts a pledge, it should have a high degree of certainty that the pledge has been validly created in the relevant jurisdiction and validly perfected, if necessary. If an FMI relies on a title transfer, including transfer of full ownership, it should have a high degree of certainty that the transfer is validly created in the relevant jurisdiction and will be enforced as agreed and not recharacterised as an invalid or unperfected pledge. An FMI should also have a high degree of certainty that the transfer itself is not voidable as an unlawful preference under insolvency law. See also principle 5 on collateral, principle 6 on margin, and principle 13 on participant-default rules and procedures.

²¹ In the context of payment systems, "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 an RTGS system, for example, 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 could entail a recalculation of all net positions and could cause significant changes to participants' balances.

²² There are several types of netting arrangements used in the market that may be relevant to an FMI. Some types of arrangements net payments or other contractual obligations resulting from market trades (or both) on an ongoing basis, while others close-out payments or obligations when an event such as insolvency occurs. There are a number of legal structures for these types of netting.

²³ An FMI may bilaterally net its obligations with each participant, facilitate the bilateral netting of obligations between participants, or provide for the multilateral netting of obligations.

legal underpinnings, net obligations may be challenged in judicial or administrative insolvency proceedings. If these challenges are successful, the FMI and its participants could be liable for gross settlement amounts that could drastically increase obligations because gross obligations could be many multiples of net obligations.

3.1.8. Novation, open offer, and other similar legal devices that enable an FMI to act as a CCP should be founded on a sound legal basis. In novation (and substitution), the original contract between the buyer and seller is discharged and the CCP is substituted between the parties as seller to the buyer and buyer to the seller, creating two new contracts. In an open-offer system, the CCP extends an open offer to act as a counterparty to market participants and thereby is interposed between participants at the time a trade is executed. If all pre-agreed conditions are met, there is never a contractual relationship between the buyer and seller. Novation, open offer, and other similar legal devices give market participants legal certainty that a CCP is obligated to effect (net) settlements if the legal framework supports the method used. In particular, CCPs should state clearly if and under what circumstances novation, open offer, or another similar legal device may be revoked or modified even after the acceptance of a trade so that netted amounts may not accurately represent the obligations of the relevant parties.

Enforceability

3.1.9. The rules, procedures, and contracts related to the operation of an FMI should be enforceable in all relevant jurisdictions even when a participant defaults or becomes insolvent. In particular, the legal basis should support the enforceability of the participant-default rules and procedures that an FMI uses to handle a defaulting or insolvent participant, especially any transfers and close out of a direct or indirect participant's assets or positions (see also principle 13 on participant-default rules and procedures). There should be a high degree of certainty that such actions taken under such rules and procedures will not be stayed, voided, or reversed. Ambiguity over the enforceability of procedures could delay and possibly prevent an FMI from taking actions to fulfil its obligations to non-defaulting participants or minimise its potential losses. Insolvency law should support isolating risk and retaining and using collateral and cash payments previously paid into an FMI, notwithstanding the default of a participant or the commencement of an insolvency proceeding against a participant.

Conflict-of-laws issues

3.1.10. Legal risk due to conflicts of law may arise if an FMI is, or reasonably may become, subject to the laws of various other jurisdictions (for example, where it accepts participants established in those jurisdictions, where assets are held in multiple jurisdictions, or where business is conducted in multiple jurisdictions) governing law applies. In such cases, an FMI should identify and analyse potential conflict-of-laws issues and develop rules and procedures to mitigate this risk. For example, the rules governing its activities should clearly indicate the law that is intended to apply to each aspect of an FMI's operations. The FMI and its participants should be aware of applicable constraints on their abilities to choose the law that will govern the FMI's activities when there is a difference in the substantive laws of the relevant jurisdictions. A jurisdiction ordinarily does not permit choices of law that would circumvent the fundamental public policy of that jurisdiction by contract. To help achieve legal certainty on conflict-of-laws issues, an FMI should obtain reasoned and independent legal opinions and analysis of the enforceability of its choice of law in relevant jurisdictions.

Mitigating legal risk

3.1.11. In general, there is no substitute for a sound legal basis and full legal certainty. In some practical situations, however, full legal certainty may not be achievable. In this case, the authorities may need to take steps to address the legal framework. Pending this resolution, an FMI should investigate steps to mitigate its legal risk through the selective use

of alternative risk-management tools that do not suffer from the legal uncertainty identified. These could include participant requirements, exposure limits, collateral requirements, and prefunded default arrangements. The use of such tools may limit an FMI's exposure if its activities are found to be not supported by relevant laws and regulations. If such controls are insufficient or not feasible, an FMI could apply activity limits and, in extreme circumstances, restrict access or not perform the problematic activity until the legal situation is addressed.

Principle 2: Governance

An FMI should have governance arrangements that are clear and transparent, promote the safety and efficiency of the FMI, and support the stability of the broader financial system, other relevant public interest considerations, and the objectives of relevant stakeholders.

Key considerations

- 1. An FMI should have documented governance arrangements that provide clear and direct lines of responsibility and accountability. These arrangements should be disclosed to owners, relevant authorities, users, and, at a more general level, the public.*
- 2. An FMI should have objectives that place a high priority on the safety and efficiency of the FMI and explicitly support financial stability and other relevant public interests.*
- 3. The roles and responsibilities of an FMI's board of directors (or equivalent) should be clearly specified, and there should be documented processes for its functioning, including processes to identify, address, and manage member conflicts of interest. The roles and responsibilities of management should also be clearly specified.*
- 4. The board should contain suitable members with the appropriate skills and incentives to fulfil its multiple roles. This typically requires the inclusion of independent board member(s). The board should review its overall performance and that of its individual board members regularly.*
- 5. The board should establish a clear, documented risk-management framework that includes the FMI's risk-tolerance policy, assigns responsibilities and accountability for risk decisions, and addresses decision making in crises and emergencies. Governance arrangements should ensure that the risk-management and internal control functions have sufficient authority, independence, resources, and access to the board.*
- 6. The board should ensure that the FMI's overall strategy, rules, and major decisions reflect appropriately the interests of its participants and other relevant stakeholders. Major decisions should be clearly disclosed to relevant stakeholders and, where there is a broad market impact, the public.*

Explanatory note

3.2.1. Governance is the set of relationships between an FMI's owners, board of directors, management, and other interested parties, including participants, authorities, and other stakeholders (such as indirect participants, participants' customers, other interdependent FMIs, and the wider market). Governance provides the processes through which an organisation sets its objectives, determines the means for achieving those objectives, and monitors performance against the objectives. Good governance provides the proper incentives for an FMI's board and management to pursue objectives that are in the interest of its stakeholders, and support the public interest. Governance arrangements should be clearly specified and documented. Information on the arrangements should be disclosed to owners, relevant authorities, users, and, at a more general level, the public.

FMI objectives

3.2.2. FMI governance arrangements provide the means to establish corporate objectives. Given the importance of FMIs and the fact that their decisions can have widespread impact, affecting multiple financial institutions, markets, and jurisdictions, it is essential for FMIs to place a high priority on the safety and efficiency of their organisation and explicitly support financial stability and other relevant public interests. Supporting the public interest is a broad concept that includes fostering fair and efficient markets as well as maintaining the safety and efficiency of the FMI and promoting financial stability. An FMI's governance objective should also include appropriate consideration of the interests of participants, participants' customers, relevant authorities, and other stakeholders. In the case of a TR, for example, it should have objectives, policies, and procedures that support the effective and appropriate disclosure of market data to relevant authorities and the public (see principle 24). For all types of FMIs, governance arrangements should provide for fair and open access (see principle 18 on access and participation requirements).

Governance arrangements

3.2.3. Governance arrangements define the structure under which the board and management operate. Key components of these arrangements should include the (a) role and composition of the board and any board committees, (b) senior management structure, (c) reporting lines between the management and board, (d) ownership structure, (e) internal governance policy, (f) design of risk management and internal controls, (g) procedures for appointment of board members and senior management, and (h) processes for ensuring performance accountability. Governance arrangements, particularly the reporting lines between management and the board, should provide clear and direct lines of responsibility and accountability and ensure sufficient independence for key functions such as risk management, internal control, and audit. These arrangements should be disclosed to owners, the authorities, users, and, at a more general level, the public.

3.2.4. There is no single set of governance arrangements that is appropriate for all FMIs and all market jurisdictions. Arrangements may differ significantly because of national law, ownership structure, or organisational form. For example, national law may require an FMI to maintain a two-tier board system, in which the supervisory board (all non-executive directors) is separated from the management board (all executive directors). Further, an FMI may be owned by its participants or by another organisation, may be operated as a for-profit or not-for-profit enterprise, or be organised as a bank or non-bank entity. While specific arrangements vary, this principle is intended to be generally applicable to all ownership and organisational structures.

3.2.5. Depending on its ownership structure and organisational form, an FMI may need to focus particular attention on certain aspects of its governance arrangements. An FMI that is part of a larger organisation, for example, should place particular emphasis on the clarity (including in relation to any conflicts of interest and outsourcing issues that may arise because of the parent or other affiliated organisation's structure) and adequacy of its own governance arrangements to ensure that decisions of affiliated organisations are not detrimental to the FMI.²⁴ In some cases where an FMI provides services that present a distinct risk profile from its primary function, the FMI may need to separate legally the additional services that it provides. Similarly, a for-profit entity may need to place particular emphasis on the independence of its risk-management arrangements to manage any conflicts between income generation and resilience. Further, a TR should ensure that it

²⁴ If an FMI is wholly owned or controlled by another entity, authorities should also review the governance arrangements of that entity to see that they do not have adverse effects on the FMI's observance of this principle.

effectively identifies and manages conflicts of interests that may arise between its public role as a centralised data repository and its own commercial interests, particularly if the TR offers services other than recordkeeping.

3.2.6. Central bank-operated systems may need to tailor the application of this principle in light of their own governance requirements and specific policy mandates. If a central bank is an operator of an FMI, as well as the overseer of private-sector FMIs, it needs to consider how to best address any possible or perceived conflicts of interest that may arise. Except when explicitly required by law, regulation, or policy, an FMI should avoid any actions which would disadvantage, or appear to disadvantage, private-sector FMIs relative to those that it owns and operates. This can be facilitated by separating the operator and oversight functions into different organisational units, managed by different personnel. Where there is competition with private-sector systems, a central bank should also be careful to protect confidential information about external systems collected in its role as overseer and avoid its misuse.

Role and composition of the board of directors

3.2.7. An FMI's board has multiple roles that should be clearly specified. These roles should include (a) establishing clear strategic aims for the entity; (b) ensuring effective monitoring of senior management (including selecting and removing its senior managers, setting their objectives, and evaluating performance); (c) establishing appropriate compensation policies (which should be consistent with best practices and based on long-term achievements, in particular the safety and efficiency of the FMI); (d) establishing and overseeing the risk-management function and material risk decisions; (e) oversight of internal control functions (including ensuring independence and adequate resourcing); (f) ensuring compliance with all supervisory and oversight requirements; (g) ensuring consideration of the public interest; and (h) providing accountability to the owners, participants, and other relevant stakeholders.²⁵

3.2.8. Governance policies related to board composition, appointment, and term should be clear and documented. The board should be composed of suitable members with an appropriate mix of skills (including strategic and relevant technical skills), experience, and knowledge of the entity (including an understanding of the FMI's interconnectedness with other parts of the financial system). Members should have a clear understanding of their roles in corporate governance, be able to devote sufficient time to their roles, and ensure that their skills remain up-to-date. Members should be able to exercise objective, independent judgment. Independence from the views of management typically requires the inclusion of a sufficient number of non-executive board members, including independent board members.²⁶ Definitions of an independent board member vary and often are determined by local rules.²⁷ The definition used by an FMI should be specified and publicly disclosed, and should exclude parties with significant business relationships with the FMI, cross-directorships, controlling shareholdings, as well as employees of the organisation. Further, an FMI should publicly disclose which board members it regards as independent. An FMI also may need to consider setting a limit on the period of time a board member may serve on the board.

²⁵ See Financial Stability Forum, *FSF principles for sound compensation practices*, April 2009, for additional guidance in establishing appropriate compensation policies.

²⁶ Having board representation by non-executive members, for example, may help in balancing considerations of safety and efficiency with competitiveness and, where applicable, profitability.

²⁷ Jurisdictions with national laws on board structure or composition that do not facilitate the use of independent members should use alternative means to enhance its board's ability to exercise independent judgment, such as advisory or supervisory boards with appropriate members.

3.2.9. Other policies and procedures related to the functioning of the board should also be clear and documented. These policies include the provision and functioning of board committees. A board would normally be expected to have, among others, an audit committee, a risk committee, and a compensation committee, or equivalents. All such committees should have clearly assigned roles and procedures.²⁸ Policies and procedures should also include processes to identify, address, and manage potential conflicts of interest of board members. Conflicts of interest include, for example, circumstances in which a board member has material competing business interests with the FMI. Further, policies and procedures should also include regular reviews of the board's performance and that of each individual member on a regular basis, as well as potentially periodic independent assessments of performance.

Role of management

3.2.10. An FMI should have clear and direct reporting lines between its management and board in order to promote accountability and the roles and responsibilities of management should be clearly specified. An FMI's management should have the appropriate experience, mix of skills, and integrity necessary for the operation and risk management of the FMI. Under board direction, management should ensure that the FMI's activities are consistent with the objectives, strategy, and risk-tolerance of the FMI, as determined by the board. Management should ensure that internal controls and related procedures are appropriately designed and executed in order to promote the FMI's objectives, and that these procedures include a sufficient level of management oversight. Internal controls and related procedures should be subject to regular review and testing by well-trained and staffed risk-management and internal audit functions. Additionally, senior management should be actively involved in the risk-control process and should ensure that significant resources are devoted to its risk-management framework.

Risk-management governance

3.2.11. Because the board is ultimately responsible for managing an FMI's risks, it should determine, endorse, and regularly review the FMI's risk-management framework to set a clear risk-tolerance policy, allocate responsibilities to manage risks, and control important risk decisions. Such decisions include the approval of new products or links, crisis-management frameworks, reporting of significant risk exposures, and the adoption of a process for consideration of adherence to relevant market protocols. The board and governance arrangements, generally, should support the use of clear and comprehensive rules and key procedures, such as detailed and robust participant-default rules and procedures (see principle 13). Board approval should be required for material decisions that would have a significant impact on the risk profile of the entity, such as the limits for total credit exposure and large individual credit exposures. The board should regularly monitor the FMI's risk profile to ensure that it is consistent with the FMI's business strategy and risk-tolerance policy. In addition, the board should ensure that the FMI has an effective system of controls and oversight, including adequate governance and project management processes, over the models used to quantify, aggregate, and manage the FMI's risks.

3.2.12. In addition, the governance of the risk-management function is particularly important. It is essential that risk-management personnel within an FMI have sufficient independence, authority, resources, and access to the board to ensure that the operations of the FMI are consistent with the risk-management framework set by the board. The reporting lines for risk management should be clear and separate from those for other operations of

²⁸ Such committees would normally be composed mainly of, and, if possible, led by, independent or non-executive directors.

the FMI, and there should be an additional direct reporting line to a non-executive director on the board via a chief risk officer (or equivalent). An FMI should consider the case for a board risk committee, and a CCP, in particular, is expected to have such a risk committee or its equivalent. A risk committee should be chaired by a sufficiently knowledgeable independent board member and consist of a majority of board members that are independent of management. The committee should also have a clear and public mandate and operating procedures.

Model validation

3.2.13. The board should ensure that there is adequate governance surrounding the adoption and use of models, such as counterparty credit, collateral, margining, and liquidity risk management systems. An FMI should validate, on an ongoing basis, the models and their methodologies used to quantify, aggregate, and manage the FMI's risks. The validation process should be independent of the development, implementation, and operation of the models and their methodologies, and the validation process should be subjected to an independent review of its adequacy and effectiveness. Validation should include (a) an evaluation of the conceptual soundness of (including developmental evidence supporting) the models, (b) an ongoing monitoring process that includes verification of processes and benchmarking, and (c) an analysis of outcomes that includes backtesting.

Internal controls and audit

3.2.14. The board is responsible for establishing and overseeing internal controls and audit. An FMI should have sound internal control policies and procedures to help manage its risks. For example, as part of a variety of risk controls, the board should ensure that there are adequate internal controls to protect against the misuse of confidential information. An FMI also should have a robust internal audit function, with sufficient resources and independence from management to provide, among other activities, a rigorous and independent assessment of the effectiveness of an FMI's risk-management and control processes (see also principle 3 on the framework for the comprehensive management of risks). The board typically will establish an audit committee to oversee the internal audit function. In addition to reporting to senior management, the audit function should have regular access to the board through an additional reporting line.

Stakeholder input

3.2.15. In making major decisions, including those relating to the design and rules of the system and its overall business strategy, an FMI's board should consider the interests of relevant stakeholders. An FMI with cross-border operations, in particular, should ensure that the full range of views across the jurisdictions in which it operates is appropriately considered in the decision-making process. Mechanisms for involving stakeholders in the board's decision-making process may include user representation on the board, user committees, and public consultation processes. As opinions among interested parties are likely to differ, the FMI should have clear processes for identifying and appropriately managing the diversity of stakeholder views and any conflicts of interest between stakeholders and the FMI. Without prejudice to local requirements on confidentiality and disclosure, the FMI should clearly and promptly inform its owners, participants, other users, and, where appropriate, the broader public, of the outcome of major decisions, and consider providing summary explanations for decisions to enhance transparency where it would not endanger candid board debate or commercial confidentiality.

Principle 3: Framework for the comprehensive management of risks

An FMI should have a sound risk-management framework for comprehensively managing legal, credit, liquidity, operational, and other risks.

Key considerations

1. *An FMI should have risk-management policies, procedures, and systems that identify, measure, monitor, and manage the range of risks that arise in the FMI.*
2. *An FMI should provide the incentives and, where relevant, the capacity to participants and their customers to manage and contain their risks.*
3. *An FMI should regularly review the material risks it bears from and poses to other entities (such as linked FMIs, settlement banks, liquidity providers, or service providers) as a result of interdependencies and develop appropriate risk-management tools to address these risks.*

Explanatory note

3.3.1. An FMI should take an integrated and comprehensive view of its risks, including the risks it bears from and poses to its participants and their customers, as well as the risks it bears from and poses to other entities, such as linked FMIs, settlement banks, liquidity providers, and service providers. An FMI should consider how various risks relate to, and interact with, each other. The FMI should manage risks from a comprehensive perspective and have a sound risk-management framework that can effectively identify, measure, monitor, and manage the risks borne by the FMI and the risks posed by the FMI to the institutions and markets it serves. This framework should include the identification and management of interdependencies. An FMI should provide appropriate incentives and, where relevant, the capacity for its participants and other entities to manage and contain their risks vis-à-vis the FMI. As discussed in principle 2 on governance, the board of directors plays a critical role in establishing and maintaining a sound risk-management framework.

Identification of risks

3.3.2. To establish an effective risk-management framework, an FMI should first identify the range of risks that arise within the FMI and the risks it directly bears from or poses to its participants, their customers, and other entities. It should identify those risks that could materially affect its ability to perform or to provide services as expected. Typically these include legal risk, credit risk, liquidity risk, and operational risk. An FMI should also consider other relevant and material risks, such as market (or price) and business risks, as well as risks that do not appear to be significant in isolation, but when combined with other risks become material. The consequences of these risks may have significant reputational effects on the FMI and may undermine an FMI's financial soundness as well as the stability of the broader financial markets. In identifying risks, an FMI should take a broad risk-management perspective and also identify the risks that it bears from other entities, such as linked FMIs, settlement banks, liquidity providers, service providers, and any entities that could be materially affected by the FMI's inability to provide services. For example, the relationship between a CSD and an LVPS to achieve DvP settlement can create system-based interdependencies. An FMI should consider these risks in developing its risk-management framework and coordinate with other interdependent FMIs and entities to manage these risks.

Comprehensive risk policies, procedures, and controls

3.3.3. An FMI's board and senior management are ultimately responsible for managing the FMI's risks (see principle 2 on governance). The board should determine an appropriate level of aggregate risk tolerance and capacity for the FMI. The board and senior management

should establish policies, procedures, and controls that are consistent with the FMI's risk tolerance and capacity. The FMI's policies, procedures, and controls serve as the basis for identifying, measuring, monitoring, and managing the FMI's risks and should cover routine and non-routine events, including the inability of a participant to meet its obligations. An FMI's policies, procedures, and controls, in particular, should address legal, credit, liquidity, and operational risks, among others. These policies, procedures, and controls should be part of a coherent and consistent framework that is reviewed and updated regularly and shared with the relevant authorities.

Information and control systems

3.3.4. In addition, an FMI should employ robust information and risk-control systems to provide the FMI itself and, where relevant, its participants and their customers with the capacity to obtain timely information and apply risk-management policies and procedures. In particular, these systems should allow for the accurate and timely measurement and aggregation of risk exposures across the system, the management of individual risk exposures and the interdependencies between them, and the assessment of the impact of various economic and financial shocks that could affect the system. Information systems should also enable the FMI and its participants to monitor their credit and liquidity exposures, overall credit and liquidity limits, and the relationship between these exposures and limits.²⁹

Incentives to manage risks

3.3.5. In establishing risk-management policies, procedures, and systems, an FMI should provide the incentives for its participants and other interdependent entities to identify, measure, and manage their own risks. There are several ways in which incentives can be provided through an FMI's policies and procedures. For example, an FMI could attach financial penalties to participants that fail to settle securities in a timely manner or to repay intraday credit by the end of the operating day. Another example is the use of loss-sharing arrangements based on proportionate exposures using formulas that encourage participants to manage their explicit or implicit bilateral credit exposures to one another. Such approaches can help reduce the moral hazard that may arise from formulas in which losses are shared equally among participants or other formulas where losses are not shared proportionally to risk.

Managing interdependencies

3.3.6. An FMI should assess its risk-management tools to ensure that it can effectively manage the risks that may arise from interdependent entities (see principle 20 on FMI links). In particular, an FMI should have robust risk-management tools to manage the legal, credit, liquidity, and operational risks it bears from and poses to other entities, in order to limit the effects of disruptions from and to such entities as well as the broader financial markets. These tools could include business continuity arrangements that allow for rapid recovery and resumption of critical activities, alternative settlement channels, and liquidity risk-management techniques.³⁰ Because of the interdependencies between and among systems,

²⁹ These information systems should permit, where practical, the provision of real-time information to ensure participants can manage risks in real time. If an FMI does not provide real-time information, it should provide clear, full, updated information to participants throughout the day (as frequently as possible) and consider appropriate enhancements to its systems.

³⁰ Although TRs are typically not exposed to financial risks from their recordkeeping activities, a TR may be a part of a network linking various entities that could include CCPs, dealers, custodians, and service providers, and therefore should ensure that it effectively manages and minimises its own risks to reduce the potential for systemic risk to spread to such linked entities.

an FMI should ensure that its crisis-management arrangements allow for effective coordination among the affected interdependent entities.

Internal controls

3.3.7. An FMI also should have comprehensive internal controls to help the board and senior management monitor and assess the adequacy and effectiveness of an FMI's risk-management policies, procedures, and systems. While business-line management serves as the first "line of defence," adherence to control mechanisms is ensured through independent compliance programmes and independent audits. A robust internal audit function can provide an independent assessment of the effectiveness of an FMI's risk-management and control processes. An emphasis on the adequacy of controls by internal audit can also help counterbalance a business-management culture that may favour business interests over establishing and adhering to appropriate controls. In addition, proactive engagement of audit and internal control functions when changes are under consideration can also be beneficial. Specifically, FMIs that involve their internal audit function in pre-implementation reviews will often reduce their need to expend additional resources to retrofit processes and systems with critical controls that had been overlooked during initial design phases and construction efforts.

Credit and liquidity risk management

An FMI or its participants may face credit and liquidity risks in the FMI's payment, clearing, and settlement processes. Credit risk is the risk that a counterparty will be unable to meet fully its financial obligations when due or at any time in the future. Liquidity risk is the risk that counterparty will have insufficient funds to meet its financial obligations when due, but may be able to do so at some time in the future. Although credit and liquidity risks are distinct concepts, there is often significant interaction between these risks. For example, the default of a participant in an FMI would likely result in the FMI facing both credit and liquidity risk, potentially requiring the FMI to draw on its liquidity resources to meet its immediate obligations. The use of collateral and margin are two key methods of mitigating and managing credit risk, liquidity risk, or both.

The following set of principles on credit risk management, collateral, margin, and liquidity risk management form the core of the standards for financial risk management and financial resources. These principles contain extensive cross references because of the interaction among the four standards. For example, the credit risk principle as applied to CCPs builds on important points in the margin principle, which also relies on the collateral principle. Taken together, these four principles are designed to provide a high degree of confidence that an FMI will continue operating and serve as a source of financial stability even in extreme market conditions. These principles are not applicable to TRs to the extent that they only record transactional data rather than offer payment, clearing, or settlement services.

Principle 4: Credit risk

An FMI should effectively measure, monitor, and manage its credit risk from participants and from its payment, clearing, and settlement processes. An FMI should maintain sufficient financial resources to cover its credit exposure to each participant fully with a high degree of confidence. A CCP should also maintain additional financial resources to cover a wide range of potential stress scenarios that should include, but not be limited to, the default of the [one/ two] participant[s] and [its/their] affiliates that would potentially cause the largest aggregate credit exposure[s] in extreme but plausible market conditions.

Key considerations

- 1. An FMI should establish a robust framework to manage the credit risks from its participants and the credit risks involved in its payment, clearing, and settlement processes. Credit risk may arise from current exposure, potential future exposure, or both.*
- 2. An FMI should identify sources of credit risk, routinely measure and monitor credit exposures, and use appropriate risk-management tools to control these risks.*
- 3. A payment system, CSD, or SSS should cover its current and, where they exist, potential future exposures to each participant fully with a high degree of confidence using collateral and other equivalent financial resources (see principle 5 on collateral).*
- 4. A CCP should cover its current and potential future exposures to each participant fully with a high degree of confidence using margin and other financial resources (see principle 6 on margin which specifies 99 percent initial margin coverage and other requirements). A CCP should also maintain additional financial resources sufficient to cover a wide range of potential stress scenarios identified in regular and rigorous stress testing that should include, but not be limited to, the default of [one/two] participant[s] and [its/their] affiliates that would potentially cause the largest aggregate credit exposure[s] in extreme but plausible market conditions.*
- 5. A CCP should determine and test regularly the sufficiency of its financial resources by rigorous backtesting and stress testing. Backtesting should be conducted daily to demonstrate sufficient initial margin coverage with a 99 percent degree of confidence. Stress tests to check the adequacy of the total financial resources available in the event of a default in extreme but plausible market conditions should be performed at least monthly, or more frequently when the products cleared or markets served in general display high volatility, become less liquid, or when the size or concentration of positions held by a CCP's participants increases significantly. In addition, more routine daily or weekly stress testing in which a CCP stresses the current positions of its participants using established parameters and assumptions should be considered to be a best practice. Comprehensive stress tests, involving a full validation of models, parameters, and assumptions and reconsideration of appropriate stress scenarios, should be conducted at least annually.*
- 6. In conducting stress testing, a CCP should consider a wide range of relevant stress scenarios, including peak historic price volatilities, shifts in other market factors such as price determinants and yield curves, multiple defaults over various time horizons, simultaneous pressures in funding and asset markets, and a spectrum of forward-looking stress scenarios in a variety of extreme but plausible market conditions. The stress-testing programme should include "reverse stress tests" aimed at identifying extreme market conditions for which the CCP's financial resources would be insufficient.*
- 7. An FMI should have clear and transparent rules and procedures that address how potentially uncovered credit losses would be allocated, including in relation to the repayment of any funds an FMI may borrow from liquidity providers. An FMI's rules and procedures should also indicate its process to replenish any financial resources it may employ during a stress event, including the potential default of the two participants and their affiliates that would cause the largest aggregate credit exposure so that the FMI can continue to operate in a safe and sound manner.*

Explanatory note

3.4.1. Credit risk is broadly defined as the risk that a counterparty will be unable to meet fully its financial obligations when due or at any time in the future. The default of a participant (and its affiliates) has the potential to cause severe disruptions to an FMI, its other participants, and financial markets more broadly. Therefore, an FMI should establish a robust

framework to manage such credit risks (see also principle 9 on money settlements and principle 16 on custody and investment risk that deal with credit risk from settlement banks and credit risk from custodians and investment counterparties, respectively). An FMI's credit risk arising from the credit exposures created by its payment, clearing, or settlement processes can be divided into two types: current exposure and potential future exposure.³¹ Current exposure, in this context, is defined as the loss that an FMI would immediately face if a participant defaulted.³² If the FMI does not guarantee settlement as in the case of some deferred net settlement systems, this exposure may be borne individually and directly by its participants rather than directly by a central entity in the FMI. Potential future exposure is broadly defined as any potential credit exposure that an FMI could face at a future date (such as the additional exposure that an FMI might potentially assume during the life of a contract or set of contracts beyond the current replacement cost).³³ The type and level of credit exposure faced by an FMI will vary based on its design.

Credit risk in payment systems, CSDs, and SSSs

3.4.2. *Sources of credit risk.* Credit risk in a payment system, CSD, or SSS is mainly driven by current exposures from extending intraday credit to participants.³⁴ For example, a central bank that operates a payment system and provides intraday credit will face credit risk. An FMI may face other credit exposures from its payment, clearing, or settlement processes. For example, if an FMI employs a DNS design and guarantees settlement, it may face current exposure arising from the failure of a participant to fund its net debit position or the failure of a participant to receive a (net) delivery of a financial instrument upon final payment. Depending on the design of the FMI, the FMI's current exposure would be equal to the payment obligation or the value of the financial instruments not delivered by the defaulting participant. If an FMI does not guarantee settlement, participants in the FMI may face financial exposures vis-à-vis each other. Whether these financial exposures are (current) credit exposures or liquidity exposures, or a combination of both, will likely depend on the design of the FMI, the instruments involved, and applicable law (see also principle 7 on liquidity risk). Payment systems, CSDs, and SSSs can avoid building up potential future exposures from their payment, clearing, and settlement activities by requiring participants to fund any credit extensions before the end of the day. Nevertheless, a payment system, CSD, or SSS can still face potential future exposures when managing credit exposures. For example, an FMI may face potential future exposure if the value of collateral posted by a participant to cover intraday credit falls below the amount of credit extended to the participant by the FMI, leaving a residual exposure.

3.4.3. *Measuring and monitoring credit risk.* A payment system, CSD, or SSS should frequently and regularly measure and monitor its credit risks throughout the day using timely

³¹ See also BCBS, *The application of Basel II to trading activities and the treatment of double default effects*, April 2005, p 4 (joint paper with IOSCO). See also BCBS, *International convergence of capital measurement and capital standards*, June 2006, annex 4, pp 254-257 (various definitions of transactions and risks; see especially, definitions of "current exposure" and "peak exposure").

³² Current exposure is technically defined as the larger of zero or the market value (or replacement cost) of a transaction or portfolio of transactions within a netting set with a counterparty that would be lost upon the default of the counterparty.

³³ Potential future exposure is technically defined as the maximum exposure estimated to occur on a future date at a high level of statistical confidence. Furthermore, potential future exposure arises from potential fluctuations in the market value of a participant's open positions between the time they are incurred, or reset to the current market price, and when the positions are closed out or hedged fully by the CCP following an event of a default.

³⁴ Many payment systems, CSDs, and SSSs do not face credit risk from their participants or payment, clearing, and settlement processes, although they may face significant liquidity risk.

information. An FMI should ensure it has access to adequate information, such as appropriate collateral valuations, to allow it to measure and monitor its current exposure and degree of collateral coverage. Where credit risks exist between participants, an FMI should provide the capacity to participants to measure and monitor their current exposures to each other in the system. Current exposure is relatively straightforward to measure and monitor; however, potential future exposure may require modelling or estimation. In order to monitor its risks associated with current exposure, an FMI should monitor market conditions for developments that could affect this risk, such as creditworthiness of its counterparties and collateral asset values. In order to estimate its potential future exposure and associated risk, an FMI should model possible changes in collateral values and market conditions over an appropriate liquidation period.

3.4.4. *Mitigating credit risk.* A payment system, CSD, or SSS should mitigate its credit risks to the extent possible. An FMI can, for example, eliminate some of its or its participants' credit risks associated with the settlement process by employing an RTGS design and, where appropriate, a DvP, DvD, or PvP settlement mechanism (see principle 12 on exchange-of-value settlement systems). In addition, an FMI should place limits on its current exposures.³⁵ Such credit limits should balance the usefulness of credit to facilitate settlement within the system against the FMI's risk exposure. In order to manage the risk from a participant default, an FMI should consider robust techniques for managing the collateral, as well as participant defaults (see principle 5 on collateral and principle 13 on participant-default rules and procedures).

3.4.5. *Managing credit risk.* A payment system, CSD, and SSS should cover its current and, where it exists, potential future exposure to each participant fully with a high degree of confidence using, as a rule, collateral and, exceptionally, equity capital (after deduction of the amount dedicated to cover general business risk) (see principles 5 and 15).³⁶ By requiring collateral to cover the credit exposures fully, an FMI mitigates, and in some cases eliminates, its current exposure and may provide participants with an incentive to manage their credit risks. Collateral or other equivalent financial resources can fluctuate in value, however, so the FMI needs to establish *prudent haircuts* to mitigate the resulting potential future exposure.

Credit risk in CCPs

3.4.6. *Sources of credit risk.* A CCP typically faces both current and potential future exposures because it typically holds open positions with its participants. Current exposure arises from fluctuations in the market value of open positions between the CCP and its participants. For example, for a CCP that collects variation margin and resets the value of positions to zero daily, a CCP's current exposure is the difference between the current value of open positions and the value of the positions when the CCP last marked them to market for the purpose of collecting variation margin. For CCPs, positions are marked to market and variation margin is collected daily. Potential future exposure arises from potential fluctuations in the market value of a defaulting participant's open positions between the time they are incurred (or reset to the market price) and when the positions are closed out or transferred by the CCP following an event of default.³⁷ For example, during the period in which a CCP

³⁵ A central bank may choose to avoid using limits on a participant's intraday credit because of its role as a monetary authority and liquidity provider.

³⁶ The equity capital may only be used up to the amount held in sufficiently liquid net assets. Such use of equity capital should strictly be limited to avoiding disruptions in settlement when collateral cannot be available timely.

³⁷ For positions that are marked to market and settled daily, potential future exposure is typically related to the interval between the last daily settlement and the point the position is closed out.

closes out a position following the default of a participant, the market value of the position or asset being cleared may change significantly, which could increase the CCP's credit exposure, potentially significantly.³⁸ A CCP can also face potential future exposure due to the potential for assets posted as margin to decline significantly in value over the close-out period.

3.4.7. *Measuring and monitoring credit risk.* A CCP should frequently and regularly measure and monitor its credit risks throughout the day using timely information. A CCP should ensure that it has access to adequate information to allow it to measure and monitor its current and potential future exposures. A CCP's current exposure is relatively straightforward to measure and monitor when relevant market prices are readily available. A CCP's potential future exposure is typically more challenging to measure and monitor and usually requires modelling and estimation of possible future market prices and other variables and conditions as well as specifying an appropriate time horizon for the close out of defaulted positions. In order to estimate the current and potential future exposures that could result from participant defaults, a CCP with these exposures should identify risk factors that could affect its losses in the close out of a defaulting participant's positions. A CCP should also monitor market conditions for developments that could affect its credit risk associated with the potential future exposures. For example, a CCP needs to monitor closely any changes in the risk factors that affect the creditworthiness of its counterparties. These factors include the existence of large exposures to an FMI's participants and, where appropriate, their customers.

3.4.8. *Mitigating credit risk.* A CCP should mitigate its credit risks to the extent possible. For example, to control the build-up of current exposures, a CCP should require that open positions are marked to market and participants contribute funds to cover any material loss in their position's net value at least daily; such a requirement limits the accumulation of current exposures and therefore controls potential future exposure. In addition, a CCP should have the authority and operational capacity to make ad hoc intraday variation margin calls from participants with positions that have lost significant value during the trading day. A CCP may choose to place limits on collateralised exposures in some cases.³⁹ Such credit limits should balance the usefulness of credit to facilitate settlement within the system against the CCP's risk exposure. Limits or additional collateral requirements on concentrations of positions may also be warranted.

3.4.9. *Managing credit risk.* A CCP should cover its current and potential future exposures to each participant fully with a high degree of confidence using margin and other financial resources (see principle 6 on margin, which specifies 99 percent initial margin coverage and other requirements). As discussed more fully in principle 6 on margin, a CCP should establish margin levels that are commensurate with the risks of each product and portfolio. In addition to collecting variation margin at least daily to prevent the accumulation of current exposures, a CCP should collect initial margin for each participant to cover its potential future exposure. Initial margin should meet an established single-tailed confidence level of at least 99 percent for each product that is margined on a product basis, each spread within or between products for which portfolio margining is permitted, and for each clearing member's

³⁸ A CCP typically closes out a defaulting participant's positions by entering the market to buy or sell contracts identical but opposite to the net positions held by the defaulting participant at current market prices (see principle 13 on participant-default rules and procedures). During this period, market prices on the open positions can change, exposing the CCP to replacement costs at the point of close out. The CCP's replacement cost therefore not only includes the current exposure that would exist at the time of default but also the potential future exposure associated with relevant changes in market prices during the liquidation period.

³⁹ In some instances, a central bank may choose to avoid limits on a participant's intraday credit because of its role as a monetary authority and liquidity provider.

portfolio. The initial margin model also should account for an appropriate time horizon for the close out of defaulted positions and be derived from price data over an adequate historical period. Margin requirements should be met by paying funds or pledging collateral, and a CCP should set appropriate standards for eligible assets and establish prudent haircuts to protect against fluctuations in value. Other resources may be used, but they should be of equivalent or stronger quality in comparison to prudently designed margin arrangements. In order to manage the risk from a participant default, a CCP should consider robust techniques for closing out or hedging open positions (see also principle 13 on participant-default rules and procedures).

3.4.10. A CCP should maintain additional financial resources, such as additional collateral or a prefunded default arrangement, to cover credit exposures from participant defaults in extreme but plausible market conditions.⁴⁰ A CCP generally remains exposed to residual risk (or tail risk) if a participant defaults and market conditions concurrently change more drastically than is anticipated in the margin calculations. In such scenarios, a CCP's losses may exceed the defaulting participant's posted margin. Although it is not feasible to cover all such tail risks given the unknown scope of potential losses due to price changes, a CCP should maintain sufficient financial resources to cover a portion of the tail risk. Accordingly, a CCP should have additional resources to cover potential stress scenarios identified in regular and rigorous stress testing that should include, but not be limited to, the default of the [one/two] participant[s] and [its/their] affiliates that would potentially cause the largest aggregate credit exposure[s]. A CCP should determine and test regularly the sufficiency of its financial resources to cover its current and potential future exposures by rigorous backtesting and stress testing.

3.4.11. *Backtesting.* A CCP should backtest its initial margin models against identified targets to validate its assumptions and models.⁴¹ Backtesting involves comparing observed outcomes derived by a model (using actual historical data, that is, what actually occurred) against forecasted outcomes. A CCP should backtest its initial margin coverage on a daily basis to demonstrate at least 99 percent coverage (see principle 6 on margin). If backtesting indicates that the model did not perform as expected (that is, the model did not identify the appropriate amount of initial margin necessary to achieve the intended coverage), a CCP should have clear procedures to determine the amount of additional margin it may need to collect, including on an intraday basis, and to recalibrate its margining system. In addition, a CCP should evaluate the source of backtesting exceedances to determine if a fundamental change to the margin methodology is warranted or if the recalibration of current parameters is necessary. Backtesting procedures alone are not sufficient to evaluate the robustness of models and adequacy of financial resources against forward-looking risks.

3.4.12. *Stress testing.* A CCP should stress test the adequacy of its total financial resources available in the event of a participant default in extreme but plausible market conditions at least monthly and more frequently when markets are unusually volatile, become less liquid, or when the size or concentration of positions held by a CCP's participants increases significantly. In addition, more routine daily or weekly stress testing in which a CCP stresses

⁴⁰ A prefunded default arrangement and other pooling-of-resources arrangements involve trade-offs that a CCP should carefully assess and balance. For example, a CCP may be able to protect itself against defaults in extreme conditions more efficiently using pooled resources, as the costs are shared among participants. The lower cost provides an incentive to increase the available financial resources so that the FMI is more financially secure. The pooling of resources, however, also increases the interdependencies among participants. The proportion of assets used to absorb a default that are pooled across participants versus the proportion that are segregated should balance the safety and soundness of the CCP against the increased interdependencies among participants in order to minimise systemic risk.

⁴¹ See BCBS, *Sound practices for backtesting counterparty credit risk models - consultative document*, April 2010.

the current positions of its participants using established parameters and assumptions should be considered to be a best practice. A CCP should have clear procedures in place to use the results of its stress tests to evaluate the sufficiency of its financial resources and the need to collect additional collateral, margin, contributions to a prefunded-default arrangement, or other financial resources and to recalibrate its margining system. In addition, as with backtesting, a CCP should evaluate the source of stress testing exceedances to determine if a fundamental change to the margin methodology is warranted or if the recalibration of current parameters is necessary. Comprehensive stress tests, involving a full validation of models, parameters, and assumptions and reconsideration or appropriate stress scenarios, should be conducted at least annually.

3.4.13. A CCP should consider a wide range of relevant stress scenarios, including peak historic price volatilities, shifts in other market factors such as price determinants and yield curves, multiple defaults over various time horizons, simultaneous pressures in funding and asset markets, and a spectrum of forward-looking stress scenarios in a variety of extreme but plausible market conditions.⁴² Stress tests should quickly incorporate emerging risks and changes in market assumptions (for example, departures from usual patterns of co-movements in prices among the products a CCP clears).⁴³ A CCP proposing to clear new products should consider movements in prices of any relevant related products. In addition, a CCP should stress test its initial margin requirements (see principle 6 on margin) to ensure coverage of potential future exposure with a high degree of confidence. A CCP should also test critical parameters in its margin system to determine the sensitivity of the system to errors in the calibration of such parameters in order to help manage model risk.

3.4.14. *Reverse stress tests.* A CCP should also conduct “reverse stress tests” aimed at identifying the extreme scenarios and market conditions in which its financial resources would provide insufficient coverage of credit exposures. Reverse stress tests require a CCP to model extreme market conditions that may go beyond what are considered extreme but plausible market conditions, so as to help understand margin calculations and the sufficiency of financial resources given the underlying assumptions modelled. Modelling extreme market conditions can help a CCP determine the limits of its model and resources; however, it requires the CCP to exercise judgment when modelling different markets and products. A CCP should develop hypothetical extreme scenarios and market conditions tailored to the specific risks of the markets and of the products that it serves.

Use of financial resources

3.4.15. The rules of an FMI should expressly set out the circumstances in which specific resources of the FMI can be used in a participant default (see principle 13 on participant-default rules and procedures and principle 23 on disclosure of rules and key procedures). These resources could include collateral or margin posted by participants, prefunded default arrangements, and resources contributed by an FMI. For the purposes of this principle, an FMI should not include as “available” to cover credit losses from participant defaults those resources that are needed to cover normal operations or operating losses, or to cover losses from other activities in which it is engaged. In addition, if an FMI serves multiple markets (either in the same jurisdiction or multiple jurisdictions), the FMI’s ability to use resources supplied by participants in one market to cover losses from a participant default in another market should have a sound legal basis, be clear to all participants, and avoid significant levels of contagion risk between markets and participants. An FMI’s design of its stress tests

⁴² See BCBS, *Principles for sound stress testing practices and supervision*, May 2009.

⁴³ Dependence in exposures among participants and open positions should be considered. If an FMI calculates exposures on a portfolio basis, then the dependence of the instruments within participants’ portfolios needs to be stressed.

should take into account the extent to which resources are pooled across markets and scenarios involving one or more participant defaults across several markets.

Contingency planning for uncovered credit losses

3.4.16. In certain extreme circumstances, the post-liquidation value of the collateral and other financial resources that secure an FMI's credit exposures may not be sufficient to cover those exposures fully. An FMI should analyse and plan for how it would address any potential residual credit exposures, adopt rules and procedures to implement such plans, and make these rules and procedures transparent to participants. This should include providing details of how potentially uncovered credit losses would be allocated, including in relation to the repayment of any funds an FMI may borrow from liquidity providers. An FMI's rules and procedures should also indicate its process for replenishing any financial resources it may employ during a stress event, including the potential default of the two participants and their affiliates that would cause the largest aggregate credit exposure, so that it can continue to operate in a safe and sound manner.

Principle 5: Collateral

An FMI that requires collateral to manage its or its participants' credit risk should accept collateral with low credit, liquidity, and market risk. An FMI should also set and enforce appropriately conservative haircuts and concentration limits.

Key considerations

- 1. An FMI should generally limit the assets it (routinely) accepts as collateral to those with low credit, liquidity, and market risk.*
- 2. An FMI should establish prudent valuation practices and develop haircuts that are regularly tested and take into account stressed market conditions.*
- 3. An FMI should avoid the concentration of holdings of certain assets because of potential concerns about the ability to liquidate such assets quickly without significant adverse price effects.*
- 4. An FMI should establish stable and conservative haircuts that are calibrated to include periods of stressed market conditions in order to reduce the need for procyclical adjustments.*
- 5. An FMI that accepts cross-border collateral should mitigate the risks associated with its use and ensure that the collateral can be used in a timely manner.*
- 6. An FMI should have a well-designed and operationally flexible collateral management system to accommodate changes in the ongoing monitoring and management of collateral.*

Explanatory note

3.5.1. Collateralising credit exposures protects an FMI and, where relevant, its participants against potential losses in the event of a participant default (see principle 4 on credit risk). Besides mitigating an FMI's own credit risk, the use of collateral can provide participants with incentives to manage the risks they pose to the FMI or other participants. A payment system, CSD, or SSS that provides intraday credit to a participant should collect sufficient collateral to cover the principal amount of each credit extension fully with a high degree of confidence, according to the provisions of principle 4 on credit risk. Similarly, a CCP should collect sufficient collateral, in the form of margin, to cover fully its participants' open positions with a high degree of confidence (see principle 6 on margin). An FMI that obtains collateral needs assurance that its value will be greater than or equal to the value of the obligation it secures

in the event of liquidation; the FMI should apply prudent haircuts to the collateral's value. Additionally, an FMI should have the capacity to use the collateral promptly when needed.

Acceptable collateral

3.5.2. An FMI should generally limit the assets it (routinely) accepts as collateral to those with low credit, liquidity, and market risks. Because of the important role collateral plays in the management of a participant default, an FMI needs assurance of its value in the event of liquidation, and an FMI needs the capacity to use the collateral quickly, especially in stressed market conditions. Where collateral with credit, liquidity, and market risk above minimum levels is accepted, the FMI needs to be able to demonstrate that it is able to set and enforce appropriately conservative haircuts and concentration limits. An FMI should adjust its requirements for acceptable collateral in accordance with changes in underlying risks.⁴⁴ In evaluating types of collateral, an FMI should consider the possibility of delays in accessing the collateral arising from the settlement conventions for transfers of the asset. In addition, participants should not be allowed to post their own debt or equity securities, nor bonds or equity of companies closely linked to them as collateral.⁴⁵ More generally, an FMI should avoid wrong-way risk by not accepting collateral that would likely lose value in the event that the participant posting the collateral defaults.⁴⁶ To prevent such wrong-way risk, the FMI, when practicable and feasible should monitor the correlation between a counterparty's creditworthiness and the collateral posted.

Valuing collateral

3.5.3. To have adequate assurance of the collateral's value in the event of liquidation, an FMI should continually monitor credit quality, market liquidity, and price volatility of the collateral it accepts. An FMI should mark its collateral to market daily, at a minimum. Furthermore, an FMI should establish valuation practices for the assets held as collateral and apply prudent haircuts to collateral whose value can fluctuate. Haircuts should reflect the potential for asset values and liquidity to decline over the interval between their last revaluation and the time by which the assets can reasonably be assumed to be liquidated. Haircuts also should incorporate stressed market conditions and reflect regular stress testing that takes into account extreme price moves in collateral assets, as well as changes in the liquidity of the markets for the asset. If market prices do not fairly represent true value, an FMI should have the authority to exercise discretion in valuing assets according to predefined and transparent methods. An FMI's haircut procedures should be independently validated at least on a yearly basis.

Avoiding concentrations of collateral

3.5.4. An FMI should avoid the concentration of holdings of certain assets, because of potential concerns about the ability to liquidate the assets quickly without significant price effects. An FMI could manage the concentration of holdings by establishing concentration limits or imposing concentration charges. Concentration charges would penalise participants for maintaining holdings of certain assets beyond a specified threshold as established by the FMI. Further, concentration limits and charges should be constructed to prevent participants

⁴⁴ In unique circumstances and subject to regulatory approval, a guarantee fully backed by collateral that is realisable on a same-day basis may serve as acceptable collateral.

⁴⁵ Covered bonds issued by a participant or a closely linked company may be accepted as collateral, provided the underlying collateral of these covered bonds would be appropriately segregated by the issuer from its own assets and considered as acceptable under this principle.

⁴⁶ Wrong-way risk is defined as the risk that an exposure to a counterparty is likely to increase when the creditworthiness of that counterparty is deteriorating.

covering a large share of their exposures with the most risky assets acceptable. These limits should be periodically stressed by an FMI to determine their adequacy.

Limiting procyclicality

3.5.5. An FMI should appropriately address procyclicality in its collateral arrangements. In this context, procyclicality typically refers to changes in risk-management practices that are positively correlated with business or credit cycle fluctuations and that may cause or exacerbate financial instability.⁴⁷ While changes in collateral values tend to be procyclical, collateral arrangements can increase procyclicality if haircut levels fall during periods of low market stress and increase during periods of high market stress. For example, in a stressed market, an FMI may require the posting of additional collateral both because of the decline of asset prices and because of an increase in haircut levels. Such actions could exacerbate market stress and drive down asset prices further, resulting in additional collateral requirements. This cycle could exert further downward pressure on asset prices. To the maximum extent that is practical and prudent, an FMI should establish stable and conservative haircuts that are calibrated to include periods of stressed market conditions in order to reduce the need for procyclical adjustments. This may create additional costs for FMIs and their participants in periods of low market stress due to higher collateral requirements, but result in additional protection and potentially less costly and disruptive adjustments in periods of high market stress.

Cross-border collateral

3.5.6. If an FMI accepts cross-border (or foreign) collateral, it should identify and mitigate any additional risks associated with its use and ensure that it can be used in a timely manner.⁴⁸ A cross-border collateral arrangement can provide an efficient liquidity bridge across markets, help relax collateral constraints for some participants, and contribute to the efficiency of some asset markets. These linkages, however, can also create significant interdependencies and risks to FMIs that need to be evaluated and managed by the affected FMIs (see also principle 20 on FMI links). The risk associated with any such interdependencies should be evaluated and addressed. For example, an FMI should have appropriate legal and operational safeguards to ensure that it can use the cross-border collateral in a timely manner and should identify and address any significant liquidity effects. An FMI also should consider foreign-exchange risk where collateral is denominated in a currency different from that in which the exposure arises, and set haircuts to address the additional risk to a high level of confidence. The FMI should have the capacity to address potential operational challenges of operating across borders, such as the operating hours of a foreign CSD or custodian.

Collateral management systems

3.5.7. Information systems that are used to monitor and manage collateral arrangements (that is, collateral management systems) should be sufficiently well designed and operationally flexible to accommodate changes in the ongoing monitoring and management of collateral. Collateral management systems, where appropriate, should allow for the timely calculation and execution of margin calls, the management of margin call disputes, and the accurate reporting of levels of initial and variation margins on a daily basis. Further, a collateral management system should track the extent of reuse of collateral (both cash and non-cash), and the rights that the FMI's counterparties give to the FMI for the collateral that

⁴⁷ See also CGFS, *The role of margin requirements and haircuts in procyclicality*, March 2010.

⁴⁸ Cross-border collateral has at least one of the following foreign attributes: (a) the currency of denomination, (b) the jurisdiction in which the assets are located, or (c) the jurisdiction in which the issuer is established.

they post. In some cases, an FMI's collateral management system should also have enhanced functionality to accommodate the timely deposit, withdrawal, substitution, and liquidation of collateral. An FMI should allocate sufficient resources to its collateral management system to ensure an appropriate level of operational performance, efficiency, and effectiveness. Senior management should ensure that the FMI's collateral management function is adequately staffed in order to ensure smooth operations, especially during times of market stress, and that all activities are tracked and reported to senior management.⁴⁹

Principle 6: Margin

A CCP should cover its credit exposures to its participants for all products through an effective margin system that is risk-based and regularly reviewed.

Key considerations

1. *A CCP should establish margin levels that are commensurate with the risks and unique attributes of each product, portfolio, and market it serves, taking into account potential increases in liquidation times in stressed markets.*
2. *A CCP should have a reliable source of timely price data for its margin models and regular collection of variation margin. A CCP should also have procedures and sound valuation models for addressing circumstances where pricing data is not readily available or reliable. As an input for its initial margin models, a CCP should rely upon pricing data covering an appropriate historical time period for the products it clears.*
3. *A CCP should adopt initial margin models and parameters that are risk-based and generate margin requirements sufficient to cover potential future exposure to participants in the interval between the last margin collection and the close out of positions following a participant default. Initial margin should meet an established single-tailed confidence level of at least 99 percent for each product that is margined on a product basis, each spread within or between products for which portfolio margining is permitted, and for each clearing member's portfolio losses. The model should also be based on adequate time horizons for the close out of the particular types of products cleared by the CCP, have an appropriate method for measuring credit exposure that accounts for relevant product risk factors and portfolio effects across products, and, to the maximum extent practical and prudent, avoid the need for destabilising, procyclical changes.*
4. *At least daily, a CCP should mark participant positions to market and collect variation margin to limit the build-up of current exposures. A CCP should have the authority and operational capacity to make intraday calls for initial and variation margin from participants with positions that have lost significant value.*
5. *In calculating margin requirements, a CCP may allow offsets or reductions in required margin across products that it clears or between products that it and another CCP clear, if the price risk of one product is significantly and reliably correlated with the price risk of the other product. Where two or more CCPs are authorised to offer cross-margining, they must have appropriate safeguards and harmonise their overall risk-management programmes.*
6. *A CCP should analyse and monitor its model performance and overall margin coverage by conducting rigorous daily backtesting and at least monthly, if not more frequent,*

⁴⁹ Information included in the summary reports should incorporate information on the reuse of collateral and the terms of such reuse including instrument, credit quality, and maturity. These reports should also track concentration to individual collateral asset classes.

stress testing. A CCP should regularly conduct an assessment of the theoretical and empirical properties of its margin model for all products it clears. A CCP, in reviewing its model's coverage, should take into account a range of scenarios, including scenarios that capture the most-volatile periods that have been experienced by the markets it serves and develop forward-looking scenarios to anticipate risks.

7. A CCP should regularly review and validate its margin system.

Explanatory note

3.6.1. An effective margining system is a key risk-management tool for a CCP to manage the credit exposures posed by its participants' open positions (see also principle 4 on credit risk). A CCP should collect collateral in the form of margin to mitigate its credit exposures for all products that it clears (see also principle 5 on collateral). Margin systems typically differentiate between two types of margin calculations: initial margin and variation margin. Initial margin is typically collected to cover potential changes in the value of each participant's position over the appropriate close-out period in the event the participant defaults. Initial margin is generally expected to cover the CCP's potential future exposures to the participant over the close-out period. Calculating potential future exposure requires modelling potential price movements and other relevant factors, as well as specifying the target degree of confidence and length of the close-out period. Variation margin is collected and typically paid out to reflect current exposures resulting from actual changes in market prices. To calculate variation margin, open positions are marked to current market prices and funds are typically paid to (or received from) a counterparty to settle any gains or losses on those positions.

Margin requirements

3.6.2. Margin requirements are an effective tool in limiting a CCP's credit exposure. Margining is particularly critical when (a) products are inherently leveraged, are significantly volatile, have long duration, or may be difficult to close out; (b) positions held are of a significant size; (c) the exposures generated by clearing participants are significant compared to their underlying financial strength; or (d) other risk controls do not adequately limit credit exposures. Margining, however, is not the only risk-management tool available to a CCP (see also principle 4 on credit risk). In the case of some CCPs for cash markets, the CCP may require each participant to provide collateral to cover this exposure; they may call these requirements margin, or they may hold this collateral in a pool known as a clearing fund.⁵⁰ The common risk-management tool is a requirement to post collateral in order to protect a CCP against some high percentage of potential future losses on its contracts with its participants. In this report, such requirements are discussed as margin requirements.

3.6.3. A CCP should establish margin levels that are commensurate with the risks and unique attributes of each product, portfolio, and market it serves. Product risk characteristics can include, but are not limited to, volatility, non-linear price characteristics, jump-to-default risk, and wrong-way risk. Additionally, a CCP for cash markets and physically deliverable derivative products should take into account failures to deliver securities or other relevant instruments in its margin methodology (that is, the CCP should continue to margin positions in which a participant fails to deliver a specific security on settlement date). Margin requirements need to account for the complexity of the underlying instruments and the availability of timely, high-quality pricing data. For example, OTC derivatives require more-conservative margin models because of their complexity and the greater difficulty of

⁵⁰ For the purposes of this report, a clearing fund is a prefunded default arrangement.

obtaining price quotes. Furthermore, the appropriate close-out period may vary among products and markets depending upon the product's liquidity and its price characteristics.

Price information

3.6.4. Reliable, timely price information is critical for initial margin models and methodologies to operate accurately and effectively and for the daily calculation of variation margin. As an input for its initial margin models, a CCP should rely upon pricing data covering an appropriate historical time period for the products it clears. A CCP should rely upon market prices from continuous, transparent, and liquid markets. When such prices are unavailable or unreliable, a CCP should supplement its price data with sound valuation models. A CCP should carefully examine its use of third-party price services to ensure the reliability and accuracy of such prices. A CCP should have its valuation models validated annually at a minimum by a qualified and independent party to ensure that its model accurately reflects market prices, and, where appropriate, the CCP should adjust the calculation of initial margins to reflect any identified model risk. A CCP should thoroughly test its valuation models under a variety of market scenarios and should have procedures for addressing circumstances where pricing data are not readily available, or not reliable. A CCP should address all pricing and market liquidity concerns on an ongoing basis in order to conduct daily measurement of its risks.

3.6.5. For some markets, such as OTC markets, prices may not be available or reliable because of the lack of a continuous liquid market. In contrast to an exchange-traded market, there may not be a steady stream of live transactions on which to determine current market prices. Although independent third party sources would be preferable, in some cases, participants may be a sufficient source of price data, but the CCP would need to implement a system that ensures that prices submitted by participants are reliable and accurately reflect the value of cleared products. Moreover, even when quotes are available, bid-ask spreads may be volatile and widen, particularly during times of market stress, thereby constraining the CCP's ability to measure accurately and promptly its exposure. A CCP should analyse historical information about actual trades submitted for clearing and indicative prices as well as the reliability of price data, especially in volatile and stressed markets. When prices are estimated, the systems and models used for this purpose must be subject to validation and various types of testing.

Initial margin methodology

3.6.6. A CCP should adopt initial margin models and parameters that are risk-based and, among other considerations, generate margin requirements that are sufficient to cover a CCP's potential future exposures to participants with a high degree of confidence. In particular, initial margin should meet an established single-tailed confidence level of at least 99 percent for each product that is margined on a product basis, each spread within or between products for which portfolio margining is permitted, and for each clearing member's portfolio losses. In setting margin requirements, a CCP should forecast potential future exposures resulting from fluctuations in market prices in the interval between the last margin collection and the close out of the relevant positions following a default. The method selected by the CCP to forecast its potential future exposure should be capable of measuring and incorporating the effects of price volatility and other factors over a close-out period selected to reflect an appropriate and thorough understanding of market size and dynamics for each product cleared by the CCP.⁵¹ The method selected by the CCP should take into account

⁵¹ CCPs often calculate exposures for a shorter period, commonly one day, and, when necessary, scale up to cover the liquidation period. A CCP should be cautious when scaling, as the standard square-root of time rule of thumb is not appropriate for prices that are serially correlated or exhibit non-linear dynamics.

correlations across products and the potential for non-linear risk exposures posed by certain products, including jump-to-default risks.

3.6.7. A CCP should select an appropriate close-out period for each product cleared by the CCP, and document the close-out periods and related analysis for each product type. A CCP should base its close-out period upon historical price and liquidity data when developing its initial margin methodology. Historical data should include the worst events that occurred in the selected time period for the product cleared as well as simulated data projections that would capture potential events outside of the historical data. In certain instances, a CCP may need to determine margin levels using a shorter historical period to reflect better new or current volatility in the market. Conversely, a CCP may need to determine margin levels based on a longer period in order to reflect past volatility. The close-out period should be set based on anticipated close-out times in stressed market conditions. Close-out periods should be set on a product-specific basis, as less-liquid products might require significantly longer close-out periods. A CCP should also consider and address position concentrations, which can lengthen close-out timeframes and add to price volatility during close outs.

3.6.8. A CCP should employ initial margin models that are regularly validated, subject to appropriate governance (see principle 2 on governance) and, to the maximum extent practical and prudent, avoid the need for destabilising, procyclical changes. The initial margin models and parameters used by a CCP should be made as transparent as possible. These models should be independently validated at least on a yearly basis. At a minimum, the basic assumptions of the analytical method selected and the key data inputs should be disclosed to participants. Ideally, a CCP would make its margin methodologies available to its participants for use in their individual risk-management efforts. In addition, the CCP's margin methodology should be reviewed at least annually, and any material revisions or adjustments should be subject to appropriate governance processes and validated by a qualified and independent party prior to implementation. CCPs operating a cross-margining arrangement should also do analysis on the impact of cross-margining on prefunded default arrangements and the evaluation of the adequacy of overall financial resources.

Wrong-way risk

3.6.9. In calculating initial margin, a CCP should collect additional initial margin to cover any exposure that could give rise to *general* wrong-way risk, in which the exposure to a counterparty is likely to increase when the creditworthiness of that counterparty is deteriorating. In addition, a CCP should identify and mitigate any exposure that may give rise to *specific* wrong-way risk, where the value of a cleared product is likely to fall specifically because the creditworthiness of that counterparty is deteriorating. For example, participants in a CCP clearing credit-default swaps should not be allowed to clear single-name credit-default swaps on their own name or their legal affiliates. A CCP is expected to review regularly its portfolio in order to identify and mitigate promptly any exposures that give rise to specific wrong-way risk and to monitor and measure exposures that give rise to general wrong-way risk.

Limiting procyclicality

3.6.10. A CCP should appropriately address procyclicality in its margin arrangements. In this context, procyclicality typically refers to changes in risk-management practices that are positively correlated with business or credit cycle fluctuations and that may cause or exacerbate financial instability. For example, in a period of rising price volatility, a CCP may require additional initial margin for a given portfolio. This could exacerbate market stress and volatility further, resulting in additional margin requirements. It may be impractical and even imprudent for a CCP to establish margin requirements that are independent of significant or cyclical changes in price volatility. Nevertheless, and to the maximum extent practical and prudent, a CCP should adopt forward-looking and relatively conservative and stable margin requirements that are specifically designed to avoid the need for destabilising, procyclical

changes. To support this objective, a CCP, for example, could consider increasing the size of its prefunded default arrangements and scheduling more-frequent collection of variation margin to limit the need and likelihood of large or unexpected margin calls in times of market stress.⁵² These procedures may create additional costs for CCPs and their participants in periods of low market volatility due to higher margin or prefunded default arrangement contributions, but result in additional protection and potentially somewhat less costly and disruptive adjustments in periods of high market volatility.

Variation margin

3.6.11. A CCP faces the risk that its exposure to its participants can change rapidly as a result of changes in prices, positions, or both. Adverse price movements, as well as participants building larger positions through new trading, can rapidly increase a CCP's exposures to its participants (although some markets may impose trading limits or position limits that reduce this risk). A CCP can ascertain its current exposure to each participant by marking each participant's outstanding positions to current market prices. To the extent permitted by a CCP's rules and supported by law, the CCP should net any gains against any losses and require frequent (at least daily) settlement of gains and losses. This settlement should involve the daily (and, when appropriate, intraday) collection of variation margin from participants whose positions have lost value and can include distributions to participants whose positions have gained value. The regular collection of variation margin stops current exposures from accumulating and mitigates the potential future exposures a CCP might face. A CCP should have the authority and operational capacity to make ad hoc intraday variation margin calls to participants with positions that have lost significant value.

Portfolio margining

3.6.12. In calculating margin requirements, a CCP may allow offsets or reductions in required margins between products for which it is the counterparty if the price risk of one product is significantly and reliably correlated with the price risk of another product.⁵³ A CCP should base such offsets on an economically meaningful methodology that reflects the degree of price dependence between the products. Often, price dependence is modelled through correlations, but more complete or robust measures of dependence should be considered, particularly for non-linear products. In any case, the CCP should consider how price dependence can vary with overall market conditions. Following the application of offsets, the CCP needs to ensure that the margin meets or exceeds the single-tailed confidence level of at least 99 percent for losses on the portfolio. If a CCP uses portfolio margining, it should continuously review and test offsets among products. It should test the robustness of its portfolio method on both actual and appropriate hypothetical portfolios. It is especially important to test how correlations perform during periods of actual and simulated market stress to assess whether the correlations break down or otherwise behave erratically. Prudent assumptions informed by these tests should be made about product offsets.

Cross-margining

3.6.13. Two or more CCPs may enter into a cross-margining arrangement, which is an agreement among the CCPs to consider positions and supporting collateral at their respective organisations as a common portfolio for participants that are members of both organisations.⁵⁴ The aggregate collateral requirements for positions held in cross-margined

⁵² See also CGFS, *The role of margin requirements and haircuts in procyclicality*, March 2010.

⁵³ Effects on the value of positions in the two products will also depend on whether these positions are long or short positions.

⁵⁴ See principle 20 on FMI links.

accounts may be reduced if the value of the positions held at the separate CCPs move inversely in a significant and reliable fashion. In the event of a participant default under a cross-margining arrangement, participating CCPs may be allowed to use any excess collateral in the cross-margined account to cover losses. When cross-margining arrangements are established, participating CCPs must share information frequently and must ensure that they have risk-mitigating protections, such as joint monitoring of positions, margin collections, and price information. If CCPs offer cross-margining, they must thoroughly understand each others' respective risk-management practices and financial resources. The CCPs should also seek to harmonise their overall risk-management systems to the extent possible and regularly monitor possible discrepancies in the calculation of their exposures, especially with regard to monitoring how price correlations perform over time. This harmonisation is especially relevant in terms of selecting an initial margin methodology, setting margin parameters, segregation of accounts and collateral, and in establishing default management arrangements. All of the precautions with regard to portfolio margining discussed above would apply to cross-margining regimes between or among CCPs. CCPs operating a cross-margining arrangement should also analyse fully the impact of cross margining on prefunded default arrangements and on the adequacy of overall financial resources. The CCPs must have in place arrangements that are legally robust and operationally viable to govern the cross-margining arrangement.

Testing margin coverage

3.6.14. A CCP should analyse and monitor its model performance and overall margin coverage by conducting rigorous daily backtesting and at least monthly, if not more frequent, stress testing. A CCP should assess its margin coverage by backtesting using participant positions from each day in order to evaluate whether there are any exceptions to its initial margin coverage. This assessment of margin coverage should be considered an integral part of the evaluation of the model's performance. Coverage should be evaluated across products and participants, and take into account portfolio effects across asset classes within the CCP. The initial margin model's actual coverage, along with projected measures of its performance, should meet at least the established single-tailed confidence level of 99 percent over an appropriate historical period for all products, spreads between or among products, and participant portfolios cleared by the CCP.⁵⁵ The CCP must also account for potential losses in extreme but plausible market conditions not covered by margin through additional financial resources, such as additional collateral or margin requirements, or a prefunded default arrangement.⁵⁶ A CCP also should regularly conduct an assessment of the theoretical and empirical properties of its margin model for all products it clears.

3.6.15. In addition to stress testing the adequacy of its total financial resources in extreme but plausible market conditions, a CCP should define a set of scenarios that will be used to test margin coverage in order to understand how the level of margin coverage might be affected by highly stressed market conditions. Those scenarios must capture a variety of historical and hypothetical scenarios, including scenarios that capture the most-volatile periods that have been experienced by the markets for which the CCP provides its services and forward-looking scenarios to anticipate risks. The CCPs margin coverage should be stress tested at least monthly using these scenarios, and the CCP must conduct a thorough analysis of the potential losses it could suffer. A CCP should evaluate the potential losses in

⁵⁵ This period should be appropriate to capture the risk characteristics of the specific instrument in order to allow the CCP to estimate the magnitude of the price changes expected to occur in the interval between the last margin collection and the time the CCP estimates it will be able to close out the relevant positions.

⁵⁶ See also principle 4 on credit risk, principle 5 on collateral, and principle 13 on participant-default rules and procedures.

individual participants' positions, as well as their customers' positions, where appropriate. Furthermore, for a CCP clearing credit instruments, the simultaneous defaults by both participants and the underlying credit instruments should be considered. Stress tests should be performed on both actual and simulated positions. Rigorous stress testing of margin requirements may take on increased importance when markets are illiquid or volatile. Stress tests should be conducted more frequently, such as intraday, when markets are unusually volatile or less liquid or when the size or concentrations of positions held by its participants increase significantly.

Timeliness and possession of margin payments

3.6.16. A CCP should establish and rigorously enforce timelines for margin payments and set appropriate consequences for failure to pay on time. A CCP with participants in a range of time zones may need to adjust its procedures for margining (including the times at which it makes margin calls) to take into account the liquidity of a participant's local funding market and the operating hours of relevant payment and settlement systems. Margin should be held by the CCP until the exposure has been extinguished; that is, margin should not be returned before settlement is successfully concluded.

Principle 7: Liquidity risk

An FMI should effectively measure, monitor, and manage its liquidity risk. An FMI should maintain sufficient liquid resources to effect same-day and, where appropriate, intraday settlement of payment obligations with a high degree of confidence under a wide range of potential stress scenarios that should include, but not be limited to, the default of [one/two] participant[s] and [its/their] affiliates that would generate the largest aggregate liquidity need in extreme but plausible market conditions.

Key considerations

1. *An FMI should have a robust framework to manage its liquidity risks from its participants, settlement banks, nostro agents, custodian banks, liquidity providers, and other entities.*
2. *An FMI should have effective operational and analytical tools to identify, measure, and monitor its settlement and funding flows on an ongoing and timely basis, including its use of intraday liquidity.*
3. *An FMI should maintain sufficient liquid resources (that is, liquid assets and prearranged funding arrangements) to effect same-day and, where appropriate, intraday settlement of payment obligations with a high degree of confidence under a wide range of potential stress scenarios that should include, but not be limited to, the default of the [one/two] participant[s] and [its/their] affiliates that would generate the largest aggregate liquidity need in extreme but plausible market conditions. A payment system, CSD, or SSS, including one employing a DNS mechanism, should have sufficient liquid resources to effect, at a minimum, timely completion of daily settlement in the event of the inability of the [one/two] participant[s] and [its/their] affiliates with the largest aggregate payment obligation[s] to settle those obligations. A CCP should have sufficient liquid resources to meet required margin payments and effect the same-day close out or hedging of the [one/two] participant[s] and [its/their] affiliates with the largest potential liquidity need[s] in extreme but plausible market conditions.*
4. *An FMI should obtain a high degree of confidence through rigorous due diligence that each liquidity provider, whether or not it is a participant of the FMI, would have sufficient information to understand and to manage its associated liquidity risks, and that it has the capacity to perform as required under the liquidity arrangement. Where relevant to assessing a liquidity provider's performance reliability with respect to a particular currency, a liquidity provider's potential access to credit from the central bank of issue*

should be taken into account. An FMI should regularly test access to its liquid resources at a liquidity provider.

- 5. For the purposes of this principle, liquid resources include cash at the central bank of issue and creditworthy commercial banks, as well as highly marketable collateral held in custody and investments that are readily available on a same-day basis and that are also convertible into cash with prearranged funding arrangements including committed liquidity lines, foreign exchange swaps, repos, or pledges. If an FMI has access to central bank credit, then an appropriate portion of its collateral holdings should be eligible for pledging to (or conducting other appropriate forms of transactions with) the relevant central bank. An FMI should not assume the availability of emergency central bank credit as a part of its liquidity plan.*
- 6. If an FMI has access to central bank accounts, payment services, or securities services, the FMI should use these services, where practical and available, to enhance its management of liquidity risk.*
- 7. An FMI should determine and test the sufficiency of its liquid resources by regular and rigorous stress testing. An FMI should have clear procedures to use the results of its stress test and to evaluate and adjust the adequacy of its liquidity risk-management framework. In conducting stress testing, an FMI should consider a wide range of relevant scenarios, including peak historic price volatilities, shifts in other market factors such as price determinants and yield curves, multiple defaults over various time horizons, simultaneous pressures in funding and asset markets, and a spectrum of forward-looking stress scenarios in a variety of extreme but plausible market conditions. Scenarios should also consider the design and operation of the FMI, and include all entities that might pose material liquidity risks to the FMI (such as settlement banks, nostro agents, custodian banks, liquidity providers, and linked FMIs). The stress-testing programme should include “reverse stress tests” aimed at identifying extreme market conditions for which the FMI’s liquid resources would be insufficient.*
- 8. An FMI should have clear and transparent rules and procedures to address unforeseen and potentially uncovered liquidity shortfalls in order to avoid unwinding, revoking, or delaying the same-day settlement of payment obligations. An FMI’s rules and procedures should also indicate its process to replenish any liquidity resources it may employ during a stress event, including the default of the two participants and their affiliates that would potentially cause the largest combined liquidity needs, so that it can continue to operate in a safe and sound manner.*

Explanatory note

3.7.1. Liquidity risk arises in an FMI when it, its participants, or other entities cannot settle their payment obligations when due as part of the clearing or settlement process. Depending on the design of an FMI, liquidity risk can arise between the FMI and its participants, between the FMI and other entities (such as its settlement bank, nostro agents, custodian banks, and liquidity providers), or between participants in an FMI (such as in a DNS payment system, CSD, or SSS). It is particularly important for an FMI to manage carefully its liquidity risk if, as is typical in many systems, the FMI relies on incoming payments from participants or other entities during the settlement process in order to make payments to other participants. If a participant or other entity fails to pay the FMI, the FMI may not have sufficient funds to meet its payment obligations to other participants. In such an event, the FMI would need to rely on its own liquidity resources (that is, liquid assets and prearranged funding arrangements) to cover the funds shortfall and complete settlement. An FMI should have a robust framework to manage its liquidity risks from the full range of participants and other entities from which it faces liquidity risk. In some cases, a participant may also play other roles within the FMI, such as a settlement or custodian bank or liquidity provider. These other roles should be considered in determining an FMI’s liquidity needs.

Sources of liquidity risk

3.7.2. An FMI should clearly identify its sources of liquidity risk and assess its current and potential future liquidity needs on a daily basis. An FMI can face liquidity risk from the default of a participant. For example, if an FMI extends intraday credit, implicitly or explicitly, to participants, such credit, even when fully collateralised, may create liquidity pressure in the event of a participant default. The FMI might not be able to convert quickly the defaulting participant's collateral into cash at short notice. If an FMI does not have sufficient cash to meet its payment obligations to participants, there will be a settlement failure. An FMI can also face liquidity risk from its settlement banks, nostro agents, custodian banks, and liquidity providers, as well as linked FMIs and service providers if they fail to perform as expected. Moreover, as noted above, an FMI may face additional risk from entities that have multiple roles within the FMI (for example, a participant that also serves as the FMI's settlement bank or liquidity provider). These interdependencies and the multiple roles that an entity may serve within an FMI should be taken into account by the FMI.

3.7.3. Participants in some FMIs that employ a DNS design may be exposed directly to liquidity risk from each other. These FMIs typically include payment systems that conduct multilateral net settlements. These FMIs also typically include certain SSSs that settle securities transfers on a gross basis with funds transfers taking place on a net basis (often referred to as DVP model 2) and that simultaneously settle securities and funds transfers on a net basis (often referred to as DVP model 3).⁵⁷ A long-standing concern is that these types of systems may address a potential settlement failure by unwinding transfers involving the defaulting participant.⁵⁸ An unwind has the effect of imposing liquidity pressures (and any replacement costs) on the non-defaulting participants. If all such transfers must be deleted and if the unwinding occurs at a time when money markets and securities lending markets are illiquid (for example, at or near the end of the day), the remaining participants could be confronted with shortfalls of funds or securities that would be extremely difficult to cover. The total liquidity pressure of unwinding would be equal to the gross value of the netted transactions.

Measuring and monitoring liquidity risk

3.7.4. An FMI should have effective operational and analytical tools to identify, measure, and monitor its settlement and funding flows on an ongoing and timely basis, including its use of intraday liquidity. In particular, an FMI should understand and assess the value and concentration of its daily settlement and funding flows through its settlement banks, nostro agents, and other intermediaries. An FMI also should be able to monitor on a daily basis the level of liquid assets (such as cash, securities, other assets held in custody, and investments) that it holds. An FMI should be able to determine the value of its available liquid assets, taking into account the appropriate haircuts on those assets.⁵⁹ In a DNS system, an FMI should provide sufficient information and analytic tools to help its participants measure and monitor their liquidity risks in the FMI.

3.7.5. If an FMI maintains prearranged funding arrangements, the FMI should also identify, measure, and monitor its liquidity risk from the liquidity providers of those arrangements. An FMI should obtain a high degree of confidence through rigorous due diligence that each liquidity provider, whether or not it is a participant of the FMI, would have sufficient information to understand and to manage its associated liquidity risks, and that it has the

⁵⁷ See also CPSS, *Delivery versus payment in securities settlement systems*, September, 1992.

⁵⁸ Unwinding involves deleting some or all of the defaulting participant's provisional funds transfers, and, in an SSS, also securities transfers, and then recalculating the settlement obligations of the other participants.

⁵⁹ See also principle 5 on collateral and principle 6 on margin.

capacity to perform as required under the liquidity arrangement. Where relevant to assessing a liquidity provider's performance reliability with respect to a particular currency, a liquidity provider's potential access to credit from the central bank of issue should be taken into account. An FMI should regularly assess each liquidity provider to see whether it is able to meet its respective same-day funding commitment and whether it is subject to commensurate regulatory, supervisory, or oversight liquidity risk-management requirements.

Managing liquidity risk

3.7.6. In managing liquidity risk, an FMI should also regularly assess its design and operations to manage liquidity risk in the system. An FMI that employs a DNS mechanism may be able to reduce its or its participants' liquidity risk by using alternative settlement designs, such as new RTGS designs with liquidity-saving features or a continuous or extremely frequent batch settlement system. In addition, it could reduce the liquidity demands of its participants by providing participants with sufficient information or control systems to help them manage their liquidity needs and risks. Furthermore, an FMI should ensure that it is operationally ready to manage the liquidity risk caused by financial or operational problems with its participants or other entities. This entails, among other things, that the FMI should have the operational capacity to reroute payments, where feasible, on a timely basis in case of problems with a correspondent bank.

3.7.7. An FMI has other risk-management tools that it can use to manage its or, where relevant, its participants liquidity. To mitigate and manage liquidity risk stemming from a participant default, an FMI could use, either individually or in combination, exposure limits, collateral or margin requirements, and prefunded default arrangements. To mitigate and manage liquidity risks from the late-day submission of payments or other transactions, an FMI could adopt rules or financial incentives for timely submission. To mitigate and manage liquidity risk stemming from a service provider or a linked FMI, an FMI could use, individually or in a combination, selection criteria, concentration or exposure limits, or collateral requirements. For example, an FMI should seek to manage or diversify its settlement flows and liquid resources to avoid an excessive concentration with one entity. This, however, may involve trade-offs between the efficiency of relying on entity and the risks of being overly dependent on that entity. These tools are often used by an FMI to also manage its credit risk.

Maintaining sufficient liquidity resources

3.7.8. An FMI should ensure that it has sufficient liquid resources to effect same-day and, where appropriate, intraday settlement of payment obligations with a high degree of confidence under a wide range of potential stress scenarios identified by regular and rigorous stress testing that should include, but not be limited to, the default of the [one/two] participant[s] and [its/their] affiliates that would generate the largest aggregate liquidity need in extreme but plausible market conditions. A payment system, CSD, or SSS, including one employing a DNS mechanism, should have sufficient liquid resources to effect, at a minimum, timely completion of daily settlement in the event of the inability of the [one/two] participant[s] and [its/their] affiliates with the largest aggregate payment obligation[s] to settle those obligations. A CCP should have sufficient liquid resources to meet required margin payments and effect the same-day close out or hedging of the [one/two] participant[s] and [its/their] affiliates with the largest potential liquidity need[s] in extreme but plausible market conditions. Liquid resources include liquid assets and prearranged funding arrangements. Other financial resources provided on an ad hoc basis may be useful if available, but should not be considered part of an FMI's liquid resources.

3.7.9. *Liquid assets.* Liquid assets typically include cash deposits at the central bank and at creditworthy commercial banks, as well as highly marketable collateral held in custody and investments that are readily available on a same-day basis. An FMI's cash balances should only be invested or held in safekeeping in a manner that bears little or no principal risk (see principle 16 on custody and investment risk). An FMI should avoid situations that subject it to

sudden changes in the value or availability of liquid assets when those changes could create unanticipated reductions in available liquidity needed to complete settlement. Collateral held by an FMI should be highly liquid to ensure that the FMI can convert the collateral on the same day into needed funds using prearranged funding arrangements (see principle 5 on collateral and principle 6 on margin).

3.7.10. *Prearranged funding arrangements.* In the event that an FMI's existing cash resources are insufficient to cover its payment obligations, an FMI typically relies on its prearranged funding arrangements that allow the FMI to use its non-cash assets to meet funding needs. These arrangements provide same-day funding through lines of credit, foreign exchange swaps, asset purchases, repos, or pledges. Such funding arrangements should be prearranged and highly reliable, even in extreme but plausible market conditions. Commercial lines of credit should be committed to help ensure that the lines of credit will be available in a timely manner. Such committed lines of credit in themselves may be used as a source of liquidity, but may not be double-counted as liquid resources. To the extent possible, other funding arrangements should also be committed rather than uncommitted (or best-efforts). Resources that are not prearranged should not be counted as liquid resources available to meet extreme but plausible market conditions. An FMI should regularly test its access to these prearranged funding arrangements.

3.7.11. *Central bank services.*⁶⁰ If an FMI has access to central bank credit, it is important that an appropriate proportion of its collateral holdings be eligible for pledging to (or conducting other appropriate forms of transactions with) the relevant central bank. Such eligibility provides assurance that the FMI can access central bank credit if available to and needed by the FMI. Access to routine central bank credit if available to an FMI in its jurisdiction constitutes a sound funding arrangement; however, such access does not eliminate the need for sound risk-management practices and adequate access to private-sector liquidity resources. With regard to emergency central bank credit, an FMI should not assume the availability of such credit as part of its liquidity plan. An FMI needs to have private-sector sources of emergency credit in place.

3.7.12. If an FMI has access to central bank accounts, payment services, securities services, or collateral management services, an FMI should use these services, where practical and available, to enhance its management of liquidity risk. Cash balances at the central bank of issue, for example, offer the highest liquidity (see principle 9 on money settlements).

3.7.13. *Procedures regarding the use of liquid resources.* An FMI should have detailed procedures for using its liquid resources to complete settlement during a liquidity shortfall. If an FMI maintains multiple types of liquid assets and prearranged funding arrangements, the FMI's liquidity procedures should clearly state when certain resources would be used (for example, the use of certain assets before prearranged funding arrangements). These may include procedures to access cash deposits or overnight investments of cash deposits, to execute same-day market transactions, or to draw on prearranged liquidity lines. An FMI should regularly test its procedures, including access to prearranged funding arrangements, for example, by activating and drawing down test amounts from committed credit facilities and by testing operational procedures for conducting same-day repos. Additionally, an FMI should adequately plan for the renewal of prearranged funding arrangements in advance of their expiration.

⁶⁰ The use of central bank services or credit is subject to the relevant legal framework and the policies and discretion of the relevant central bank.

Stress testing of liquidity needs and resources

3.7.14. An FMI should determine and test the sufficiency of its liquid resources by regular and rigorous stress testing. An FMI should have clear procedures to use the results of its stress test and to evaluate and adjust the adequacy of its liquidity risk-management framework. Stress testing should consider a wide range of relevant scenarios, including peak historic price volatilities, shifts in other market factors such as price determinants and yield curves, multiple defaults over various time horizons, simultaneous pressures in funding and asset markets, and a spectrum of forward-looking stress scenarios in a variety of extreme but plausible market conditions.⁶¹ Scenarios should also consider the design and operation of the FMI, and include all entities that might pose material liquidity risks to the FMI (such as settlement banks, nostro agents, custodian banks, liquidity providers, and linked FMIs). An FMI should also consider any strong inter-linkages or similar exposures between its participants and assess the probability of multiple failures and the contagion effect among its participants that such failures may cause. Scenarios should *specifically* include, but not be limited to, the default of the [one/two] participant[s] and [its/their] affiliates that would generate the largest aggregate liquidity need in extreme but plausible market conditions. Stress testing should be performed at least monthly, and more frequently when markets are unusually volatile, less liquid, or when the size or concentrations of positions held by its participants increase significantly. In addition, more routine daily or weekly stress testing in which a CCP stresses the current positions of its participants using established parameters and assumptions should be considered to be a best practice. Comprehensive stress tests, involving a full validation of models, parameters, and assumptions and reconsideration or appropriate stress scenarios, should be conducted at least annually.

3.7.15. *Reverse stress tests.* An FMI should also conduct “reverse stress tests” aimed at identifying the extreme scenarios and market conditions in which its liquidity resources would provide insufficient coverage. Reverse stress tests require an FMI to model extreme market conditions that may go beyond what are considered extreme but plausible market conditions, so as to help understand the sufficiency of liquidity resources given the underlying assumptions modelled. Modelling extreme market conditions can help an FMI determine the limits of its model and resources; however, it requires the FMI to exercise judgment when modelling different markets and products. An FMI should develop hypothetical extreme scenarios and market conditions tailored to the specific risks of the markets and of the products that it serves.

Contingency planning for uncovered liquidity shortfalls

3.7.16. In certain extreme circumstances, the liquid resources of an FMI or its participants may not be sufficient to meet the payment obligations of the FMI to its participants or the payment obligations of participants to each other within the FMI.⁶² In a stressed environment, for example, normally liquid assets held by an FMI may not be sufficiently liquid to obtain same-day funding, or the liquidation period may take longer than expected. An FMI should have clear and transparent rules and procedures to address unforeseen and potentially uncovered liquidity shortfalls in order to avoid unwinding, revoking or delaying the same-day settlement of payment obligations. These rules and procedures should also indicate its process to replenish any liquidity resources it may employ during a stress event, including the default of the two participants and their affiliates that would potentially cause the largest combined liquidity need, so that it can continue to operate in a safe and sound manner.

⁶¹ See BCBS, *Principles for sound stress testing practices and supervision*, May 2009.

⁶² These exceptional circumstances could arise from unforeseen operational problems or unanticipated rapid changes in market conditions.

3.7.17. If an FMI allocates potentially uncovered liquidity shortfalls to its participants, the FMI should have clear and transparent rules and procedures for the allocation of shortfalls. These procedures could involve a funding arrangement between the FMI and its participants, the mutualisation of shortfalls among participants according to a clear and transparent formula, or the use of liquidity rationing (for example, reductions in payouts to participants). Any allocation rule or procedure must be discussed thoroughly with and communicated clearly to participants, as well as be consistent with participants' respective regulatory liquidity risk-management requirements. Furthermore, an FMI should consider and validate, through simulations and other techniques, and through discussions with each participant, the potential impact on each participant from any such same-day allocation of liquidity risk and their ability to bear proposed liquidity allocations.

Settlement

A key risk that an FMI faces is settlement risk, which is the risk that settlement will not take place as expected. An FMI faces this risk whether settlement of a transaction occurs on the FMI's books, on the books of another FMI, or on the books of a commercial bank. The following set of principles provides guidance on settlement finality, money settlements, and physical deliveries.

Principle 8: Settlement finality

An FMI should provide clear and certain final settlement, at a minimum, by the end of the value date. Where necessary or preferable, an FMI should provide final settlement intraday or in real time.

Key considerations

1. *An FMI should clearly define the point at which the settlement of a payment, transfer instruction, or other obligation is irrevocable and unconditional.*
2. *An FMI should complete final settlement no later than the end of the value date, and preferably intraday or in real time, to reduce settlement risk. An LVPS, CSD, or SSS should consider adopting RTGS or multiple-batch processing during the settlement day.*
3. *An FMI should clearly define the point in time before settlement when unsettled payment or transfer instructions or obligations may not be revoked.*

Explanatory note

3.8.1. An FMI should be designed to provide clear and certain final settlement of payments, transfer instructions, or other obligations. Final settlement is defined as the irrevocable and unconditional transfer of an asset or financial instrument or the discharge of an obligation by the FMI or its participants in accordance with the terms of the underlying contract.⁶³ A payment, transfer instruction, or other obligation that is accepted by an FMI for settlement according to its terms and conditions should be settled with finality on the intended value date, which is the day on which it is due and typically available to the receiving participant.⁶⁴ The completion of final settlement by the end of the FMI's business day on the value date is essential. Deferral of final settlement to the next business day can

⁶³ Final settlement (or settlement finality) is a legally defined moment. See also principle 1 on legal basis.

⁶⁴ This principle is not intended to discourage an FMI from offering a facility for entering transaction details in advance of the value date.

create credit and liquidity pressures and potentially systemic risk. Where necessary or preferable, an FMI should provide intraday or real-time settlement finality to reduce settlement risk.

Final settlement

3.8.2. An FMI should clearly define in its rules and procedures the point at which the settlement of a payment, transfer instruction, or other obligation is irrevocable and unconditional. Settlement cannot be considered final until there is no further possibility that a payment, transfer instruction, or other obligation can be revoked or that unfulfilled conditions can lead to the reversal or unwinding of transactions that are being settled. An FMI's rules and legal framework generally determine finality. The legal regime governing the FMI, including the insolvency law, must acknowledge the discharge of a payment, transfer instruction, or other obligation between the FMI and system participants, or between or among participants, for the transaction to be considered final. Because of the complexity of legal regimes and system rules, a well reasoned legal opinion is generally necessary to establish at the point which finality takes place (see also principle 1 on legal basis).

Same-day settlement

3.8.3. An FMI's processes should be designed to, at a minimum, complete final settlement no later than the end of the value date. This means that any payment, transfer instruction, or other obligation that has been submitted to and accepted by an FMI, in accordance with its risk-management and other relevant acceptance criteria, should be settled on the intended value date. An FMI that does not provide final settlement on the value date (or same-day settlement) would not satisfy this principle even if the settlement date of the transaction is adjusted back to the value date after settlement. The reason is that in most such arrangements, there is no certainty that final settlement will occur on the value date as expected. Deferral of final settlement to the next-business day can entail overnight risk exposures. For example, if a CSD or CCP conducts its money settlements using instruments or arrangements that involve next-day settlement, a participant default on its settlement obligations between the initiation and finality of settlement could pose significant credit and liquidity risks to an FMI and its other participants.⁶⁵

Intraday settlement

3.8.4. Depending on the type of instructions or obligations that an FMI settles, the use of intraday settlement, either in batches or in real time, may be necessary or desirable to reduce settlement risk.⁶⁶ An FMI can complete final settlement intraday through batch settlement or RTGS. RTGS is the real time settlement of payment or transfer instructions or obligations individually on an order-by-order basis. Batch settlement is the settlement of groups of instructions or obligations together at one or more discrete, often pre-specified times during the processing day. With batch settlement, the time between the acceptance and final settlement of payment or transfer instructions or obligations should be kept short.⁶⁷ To speed up settlements, an FMI should encourage the prompt submission of payment or transfer instructions or obligations to the FMI. An FMI also should inform participants of final account balances as quickly as possible, preferably in real time.

⁶⁵ In most cases, next-day settlements over weekend periods involve multi-day settlement risk.

⁶⁶ For example, intraday or real-time finality is sometimes necessary for monetary policy or payments operations, settlement of back-to-back transactions, intraday margin calls by CCPs, or safe and efficient cross-border links between CSDs.

⁶⁷ Transactions, in certain circumstances, may be settled on a gross basis multiple times during the operating day. This arrangement is normally associated with contingency situations.

3.8.5. The use of batch settlement and RTGS involves different tradeoffs. Batch settlement based on a DNS mechanism, for example, may expose participants to credit and liquidity risks for the period during which settlement is deferred. These risks, if not sufficiently controlled, could result in the inability of one or more participants to meet their financial obligations. Multiple batch settlements per value date may help mitigate these risks. More fundamentally, an RTGS system can mitigate or eliminate these risks, but requires participants to have sufficient liquidity to cover their outgoing payments; the use of this approach can require relatively large amounts of intraday liquidity. This liquidity can come from various sources, including balances at a central bank or commercial bank, incoming payments, and intraday credit. An RTGS may be able to reduce liquidity needs by additional means, for instance by implementing a queuing facility or other arrangements that are designed to act as liquidity-saving mechanisms.⁶⁸

Revocation of transfer instructions

3.8.6. An FMI should clearly define the point before settlement after which unsettled payment or transfer instructions or obligations may not be revoked. In general, an FMI should prohibit or discourage the unilateral revocation of accepted and unsettled payment or transfer instructions or obligations after a certain point or time on the settlement day, so as to avoid creating liquidity risks. In all cases, cutoff times and materiality rules for exceptions should be clearly defined. The rules should make clear that extensions are exceptional and require individual justifications. For example, an FMI may want to permit extensions for reasons connected with the implementation of monetary policy or widespread financial market disruption. If extensions are allowed for participants with operating problems to complete processing, the rules governing the approval and duration of such extensions should be clear to participants.

Principle 9: Money settlements

An FMI should conduct its money settlements in central bank money where practical and available. If central bank money is not used, an FMI should minimise and strictly control the credit and liquidity risk arising from the use of commercial bank money.

Key considerations

- 1. An FMI should conduct its money settlements in central bank money, where practical and available, to avoid credit and liquidity risks.*
- 2. If central bank money is not used, an FMI should conduct its money settlements using a settlement asset with little or no credit or liquidity risk.*
- 3. An FMI that settles in commercial bank money should establish and monitor adherence to strict criteria for its settlement banks that take account of, amongst other things, their supervision, creditworthiness, capitalisation, access to liquidity, and operational reliability.*
- 4. An FMI should closely control the credit and liquidity risks from its commercial settlement banks, including the distribution of exposures among its commercial settlement banks.*
- 5. If an FMI conducts money settlements on its own books, it should minimise and strictly control its credit and liquidity risks.*

⁶⁸ See also CPSS, *New developments in large value payment systems*, May 2005.

Explanatory note

3.9.1. An FMI typically needs to conduct money settlements with or between its participants for a variety of purposes, such as the settlement of individual payment obligations, funding and defunding activities, and the collection and distribution of margin payments.⁶⁹ To conduct such money settlements, an FMI can use central bank money (when obligations between direct participants are discharged via settlement on the books of the central bank of issue) or commercial bank money (when settlement occurs on the books of a commercial bank or on the books of a private-sector FMI, including itself). An FMI may also use a combination of central bank and commercial bank monies to conduct settlements, for example, by using central bank money for funding and defunding activities and using commercial bank money (or its books) for the settlement of individual payment obligations between participants.

Central bank money

3.9.2. An FMI should conduct its money settlements using central bank money, where practical and available. The use of central bank money to settle payments, transfer instructions, or other obligations avoids creating additional credit and liquidity risks for an FMI and its participants. With the use of central bank money, an instruction or obligation is typically discharged by providing the FMI or its participants with a direct claim on the central bank, that is, the settlement asset is central bank money. Central banks have the lowest credit risk and highest liquidity with regard to their currency of issue. Indeed, one of the fundamental purposes of central banks is to provide a safe and liquid settlement asset. The use of central bank money, however, may not always be practical or available. For example, an FMI or its participants may not have direct access to all relevant central bank accounts and payment services. For a multicurrency FMI that has access to all relevant central bank accounts and payment services may find that some central bank payment services do not operate, or provide finality, at the times when it needs to make money settlements.

Commercial bank money

3.9.3. If central bank money is not used, an FMI should conduct its money settlements using a settlement asset with little or no credit or liquidity risk. An alternative to the use of central bank money is commercial bank money. When settling in commercial bank money, a payment obligation is typically discharged by providing the FMI or its participants with a direct claim on the relevant commercial bank. To conduct settlements in commercial bank money, an FMI and its participants need to establish accounts with at least one commercial bank, and likely hold intraday or overnight balances, or both. The use of commercial bank money to settle payment obligations, however, can create additional credit and liquidity risks for the FMI and its participants. For example, if the commercial bank conducting settlement becomes insolvent, the FMI and its participants may not have immediate access to their settlement funds or ultimately receive the full value of their funds.

3.9.4. If an FMI uses a commercial bank for its money settlements, it should take steps to limit its credit and liquidity risks to the commercial settlement bank. For example, an FMI should limit both the probability of being exposed to a commercial settlement bank's failure and limit the potential losses and liquidity pressures to which it would be exposed in the event of such a failure. An FMI should establish strict criteria for its commercial settlement banks that address, among other things, their regulation and supervision, creditworthiness, capitalisation, access to liquidity, and operational reliability. A commercial settlement bank should be subject to effective banking supervision and regulation. It should also be

⁶⁹ It should be noted, however, that the settlement of payment obligations does not always require a transfer of monies; in some cases, an offsetting process can discharge obligations.

creditworthy, well capitalised, and have ample liquidity from the marketplace or the central bank of issue. It should also have the technical capacity to provide reliable payment services at the times and on the terms required by the FMI. An FMI should actively monitor strict adherence to these requirements on an ongoing basis.

3.9.5. In addition, an FMI should take further steps to limit its credit exposures and liquidity pressures by diversifying the risk of a commercial settlement bank failure, where reasonable, through the use of multiple commercial settlement banks and the use of concentration limits. In some jurisdictions, however, there may be only one commercial settlement bank that meets appropriate criteria for creditworthiness and operational reliability. Additionally, even with multiple commercial settlement banks, the extent to which risk is actually diversified depends upon the distribution or concentration of participants using different commercial settlement banks and the amounts owed by those participants.⁷⁰ An FMI should closely control the full range and concentration of exposures to commercial settlement banks and assess its potential losses and liquidity pressures as well as those of its participants in the event that the commercial settlement bank with the largest share of activity were to fail.

Settlement on the books of an FMI

3.9.6. If an FMI conducts money settlements on its own books, it should minimise and strictly control its credit and liquidity risks. In such an arrangement, a payment obligation may be discharged by providing an FMI's participants with a direct claim on the FMI itself. The credit and liquidity risks associated with a claim on an FMI are therefore directly related to the FMI's overall credit and liquidity risks. One way that an FMI may settle payment obligations is for the FMI to establish itself as a supervised special-purpose institution.⁷¹ For example, an FMI could limit its legal powers and operations to only core clearing and settlement processes (such as limiting the provision of cash accounts to participants). In some cases, an FMI can further mitigate its risks by having participants fund and defund their accounts at the FMI using central bank money. In such an arrangement, an FMI is able to back the settlements conducted on its own books with balances that it holds in its account at the central bank.

Principle 10: Physical deliveries

An FMI should clearly state its obligations with respect to the delivery of physical instruments or commodities and should identify, monitor, and manage the risks associated with such physical deliveries.

Key considerations

1. *An FMI's rules should clearly state its obligations with respect to the delivery of physical instruments or commodities.*
2. *An FMI should identify, monitor, and manage the risks associated with the storage and delivery of physical instruments or commodities.*

⁷⁰ The concentration of an FMI's exposure to a commercial settlement bank can be further exacerbated if the commercial settlement bank has multiple roles with respect to the FMI. For example, an FMI may use a particular commercial settlement bank that is also a participant in the FMI for depositing and investing funds, for depositing and transferring securities, and for back-up liquidity resources. See principle 7 on liquidity risk.

⁷¹ Depending on local laws, these special-purpose institutions may be required to have banking licenses and be subject to prudential supervision.

Explanatory note

3.10.1 An FMI may settle transactions using physical delivery, which is the delivery of an instrument or asset in physical form.⁷² For example, the settlement of commodities or other futures contracts cleared by a CCP may allow or require the physical delivery of the underlying commodity or financial instruments. An FMI that provides physical settlement should have rules that clearly state its obligations with respect to the delivery of physical instruments or commodities. In addition, an FMI should identify, monitor, and manage the risks associated with the storage and delivery of such physical instruments and commodities.

Rules that state the FMI's obligations

3.10.2 An FMI's rules should clearly state its obligations with respect to the delivery of physical instruments or commodities. The obligations that an FMI may assume with respect to physical deliveries vary based on the types of instruments or assets that the FMI settles. An FMI should state clearly whether it has an obligation to make or receive physical deliveries or whether it indemnifies participants for losses incurred in the delivery process. Clear rules on physical deliveries enable the FMI and its participants to take the appropriate steps to mitigate the risks posed by such physical deliveries. An FMI should engage with its participants to ensure that they have an understanding of their obligations and the procedures for effecting physical delivery.

Risk of storage and delivery

3.10.3 An FMI may have to identify, monitor, and manage the additional risks and costs associated with the storage and delivery of physical instruments or commodities. For example, when the physical delivery of the underlying interest is specified in a derivatives contract, issues relating to delivery may arise. An FMI should plan for and manage physical deliveries by establishing definitions for acceptable physical instruments or commodities, the appropriateness of alternative delivery locations or assets, rules for warehouse operations, and the timing of delivery, when relevant. If an FMI is responsible for the warehousing and transportation of a commodity, it should make arrangements that take into account the commodity's particular characteristics (for example, storage under specific conditions, such as an appropriate temperature and humidity for perishables).

3.10.4 An FMI should have appropriate processes, procedures, and controls to manage the risks of storing and delivering physical assets, such as the risk of theft, loss, counterfeiting, or deterioration of assets. An FMI's policies and procedures should ensure that the FMI's record of physical assets accurately reflects its holdings of assets, for example, by separating duties between handling physical assets and maintaining records. An FMI also should have appropriate employment policies and procedures for personnel that handle physical assets and should include appropriate pre-employment checks and training. In addition, an FMI should consider other measures, such as insurance coverage and random storage facility audits, to mitigate its storage and delivery risks (other than principal risk).

Matching participants for delivery and receipt

3.10.5 In some instances, an FMI serving a commodity market can reduce its risks associated with the physical storage and delivery of commodities by matching participants that have delivery obligations with those due to receive the commodities, thereby removing

⁷² The term "physical delivery" in the credit-default swap market typically refers to the process by which the buyer of a credit-default swap contract "delivers" an instrument to the seller after a credit event, which does not necessarily involve the delivery of an instrument in paper form. This type of "physical delivery" is not covered under this principle. Immobilised and dematerialised securities are outside the scope of this principle and are covered in principle 11 on CSDs.

itself from direct involvement in the storage and delivery process. In such instances, the legal obligations for delivery should be clearly expressed in the rules, including default rules, and any related agreements. In particular, an FMI should be clear whether the receiving participant should seek compensation from the FMI or the delivering participant in the event of a loss. Additionally, an FMI holding margin should not release the margin of the matched participants until it confirms that both have fulfilled their respective obligations. An FMI also should have the power to check that its participants have the necessary systems and resources to be able to fulfil their physical delivery obligations.

Central securities depositories and exchange-of-value settlement systems

CSDs and exchange-of-value settlements have unique risks associated with its function and design. While the nature and scope of activities performed by a CSD varies based on jurisdiction and market practices, it plays a critical role in the protection of securities and helps ensure the integrity of securities transactions. A CSD should immobilise or dematerialise the securities that it holds on behalf of its securities issuers and participants to the extent possible. An exchange-of-settlement system should ensure settlement by linking the final settlement of one obligation to another.

Principle 11: Central securities depositories

A CSD should have appropriate rules and procedures to help ensure the integrity of securities issues and minimise and manage the risks associated with the safekeeping and transfer of securities. A CSD should maintain securities in an immobilised or dematerialised form for their transfer by book entry.

Key considerations

- 1. A CSD should have appropriate rules and procedures, including robust accounting practices and controls, to safeguard the interests of securities issuers and holders, prevent the unauthorised creation or deletion of securities, and conduct periodic reconciliation of securities issues it maintains.*
- 2. A CSD should prohibit overdrafts or debit balances in securities accounts.*
- 3. A CSD that maintains a link to another CSD should prohibit the provisional transfers of securities or, at a minimum, prohibit the retransfer of securities prior to the first transfer becoming final.*
- 4. A CSD should maintain securities in an immobilised or dematerialised form for their transfer by book entry. Where appropriate, a CSD should provide incentives to immobilise or dematerialise securities.*
- 5. A CSD should identify, measure, monitor, and manage its risks from other activities that it may perform; additional tools may be necessary in order to address these spillover effects.*
- 6. A CSD providing central safekeeping and settlement services to a CCP should ensure that the CCP would not pose additional material risks (such as liquidity and operational risk) as compared to any other participant in the CSD and, where necessary, take additional measures.*

Explanatory note

3.11.1. A CSD is an entity that holds securities accounts and, in many countries, operates an SSS. A CSD also provides central safekeeping and asset services, which may include the administration of corporate actions and redemptions, and plays an important role in helping

to ensure the integrity of securities issues.⁷³ Securities can be held at the CSD either in physical (but immobilised) form or in dematerialised form (that is, as electronic records). The precise activities of a CSD vary based on jurisdiction and market practices. A CSD, for example, may be the official securities registrar and maintain the definitive record of legal ownership for a security; however, in some cases, another entity may serve as the official securities registrar. Further, the activities of a CSD may vary depending on whether it operates in a jurisdiction with a direct or indirect holding arrangement or a combination of both.⁷⁴ A CSD should have clear and comprehensive rules and procedures to ensure that the securities it holds on behalf of its participants are appropriately accounted for on its books and protected from risks associated with the other services that the CSD may provide. An SSS is also expected to comply with elements of this principle, as appropriate.

Rules and procedures to safeguard the integrity of securities issues

3.11.2. The preservation of the rights of issuers and holders of securities is essential for the orderly functioning of a securities market. Therefore, a CSD should employ appropriate rules, procedures, and controls to safeguard the interests of securities issuers and holders, prevent the unauthorised creation or deletion of securities, and conduct periodic reconciliation of the securities issues that it maintains. A CSD should, in particular, maintain robust accounting practices, daily reconciliation and end-to-end auditing to verify that its records are accurate and provide a complete accounting of its securities issues. If a CSD records the issuance of securities (alone or in conjunction with other entities), it should verify and account for the initial issuance of securities and ensure that newly issued securities are delivered in a timely manner. To further safeguard the integrity of the securities issues, a CSD should conduct periodic and at least daily reconciliation of the total securities issues in a CSD for each issuer (or its issuing agent), and ensure that the total number of securities recorded in the CSD for a particular issue is equal to the securities of that issue held on the CSD's books. Reconciliation may require coordination with other entities if the CSD does not (or does not exclusively record the issuance of the security), or is not the official registrar of the security). For instance, if the issuer (or its issuing agent) is the only entity that can verify the total amount of an individual issue, it is important that the CSD and the issuer cooperate closely to ensure that the securities in circulation in a system correspond to the volume issued into that system. If the CSD is not the official securities registrar for the securities issuer, reconciliation with the official securities registrar should be required.

Overdrafts, debit balances, and provisional transfers in securities accounts

3.11.3. A CSD should prohibit overdrafts and debit balances in securities accounts to avoid credit risk and further reduce the potential for the creation of securities. If a CSD were to allow overdrafts or a debit balance in a participant's securities account in order to credit another participant's securities account, a CSD would effectively be creating securities and affect the integrity of the securities issue. In the case of CSD-to-CSD links, the linked CSDs should prohibit the provisional transfers of securities or, at a minimum, prohibit the retransfer of securities prior to the first transfer becoming final. Risk-management controls related to

⁷³ Where an entity legally defined as a CSD or SSS does not hold or facilitate the holding of assets or collateral owned by their participants, the CSD or SSS in general would not be required to have arrangements to manage the safekeeping of such assets or collateral.

⁷⁴ There are different types of direct holding systems. In some countries, each direct owner of a security is known to the CSD or the issuer. In other countries, the beneficial owner is also known to the CSD or the issuer. In some countries, the use of direct holding systems is required by law. Alternatively, an indirect holding system employs a multi-tiered arrangement for the custody and transfer of ownership of securities (or the transfer of similar interests therein) in which investors are identified only at their custodian. In either system, the shareholder list may be maintained by the issuer, CSD, securities registrar, or transfer agent.

provisional transfers, however, may impose significant opportunity costs on users of the link, especially on active trading parties who engage in back-to-back transactions (see principle 20 on links).

Immobilisation and dematerialisation

3.11.4. A CSD can maintain securities in physical form or dematerialised form.⁷⁵ Securities held in physical form may be transferred via physical delivery or immobilised and transferred via book entry.⁷⁶ The safekeeping and transferring of securities in physical form, however, creates additional risks and costs, such as the destruction or theft of certificates, increased processing costs and increased time to clear and settle securities transactions. By immobilising securities and transferring them via book entry, a CSD can improve efficiency through increased automation and reduce the risk of errors and delays in processing.⁷⁷ Dematerialising securities also eliminates the risk of destruction or theft of certificates. A CSD should therefore hold securities in an immobilised or dematerialised form and transfer securities via book entry.⁷⁸ To facilitate the immobilisation of all physical securities of a particular issue, a global note representing the whole issue can be issued. In certain cases, however, immobilisation or dematerialisation within a CSD may not be legally possible or practicable. Legal requirements, for example, may limit the possible implementation or extent of immobilisation and dematerialisation. In such cases, a CSD and the relevant authority should strive to support securities immobilisation or dematerialisation to the greatest extent possible, such as through the use of incentives.

Segregation of assets

3.11.5. A CSD should protect against custody risk, including the risk of loss because of the CSD's insolvency, claims by the CSD's creditors, or the CSD's negligence, misuse of assets, fraud, poor administration, inadequate recordkeeping, or failure to protect a participant's interests in securities. At a minimum, a CSD should segregate its participants' securities from the CSD's own assets and those of other participants. In addition, a CSD also should support the segregation of securities belonging to a participant's customers on the participant's books by providing appropriate accounts and services and facilitate the portability of customer holdings, should the participant default, to another participant. Where relevant, the segregation of accounts typically helps provide appropriate protection against the claims of a CSD's creditors or the claims of the creditors of a participant in the event of its insolvency. Where appropriate, a CSD should consider insurance or other compensation schemes to protect against misappropriation, destruction, and theft of securities.

Other activities

3.11.6. If a CSD provides services other than central safekeeping and administration of securities and settlement, it should identify, monitor, and manage the risks associated with those activities, particularly credit and liquidity risks, consistent with the respective principles in this report. Additional tools may be necessary to address these risks, or the FMI may need to separate legally the other activities. For example, a CSD may provide a centralised

⁷⁵ Dematerialisation involves the elimination of physical certificates or documents of title that represent ownership of securities so that securities exist only as accounting records.

⁷⁶ Immobilisation involves concentrating the location of securities in a depository and transferring ownership by book entry.

⁷⁷ Improved efficiency through book-entry settlement also may support the development of more-liquid securities markets.

⁷⁸ Book-entry transfers also facilitate the settlement of securities through a DvP mechanism, thereby reducing or eliminating principal risk in settlement (see also principle 12 on exchange-of-value settlement systems).

securities lending facility to help facilitate timely settlement and reduce settlement fails, or otherwise offer services that support the bilateral securities lending market. If a CSD acts as a principal in a securities lending transaction, it should identify, monitor, and manage its risks, including potential credit and liquidity risks, under the conditions set in principles 4 and 7. For example, the securities lent by the CSD may not be returned when needed because of a counterparty default, operational failure, or legal challenge. The CSD would then need to acquire the lent securities in the market, perhaps at a cost, thus exposing the CSD to credit and liquidity risks.⁷⁹

3.11.7. In some cases, a CCP may use the services of a CSD, either as a participant in the CSD or as a linked FMI. A CCP may use a CSD for a number of reasons, including the settlement of margins and delivery of securities. A CSD providing custody and settlement services to a CCP should facilitate segregation and portability at the CCP and ensure that the CCP does not pose additional risks (such as liquidity and operational risk) as compared to any other participant in the CSD. If the CCP does pose additional risks to the CSD, relative to any other participant, the CSD should manage those risks through heightened standards or additional risk-mitigating tools. For example, a CSD may need to address a CCP's liquidity needs or the risk of a fail on a CCP's transaction using additional risk-mitigating tools because the CCP may require significantly more liquidity than any other participant.

Principle 12: Exchange-of-value settlement systems

If an FMI settles transactions that involve the settlement of two linked obligations (for example, securities or foreign exchange transactions), it should eliminate principal risk by conditioning the final settlement of one obligation upon the final settlement of the other.

Key considerations

1. *An FMI that is an exchange-of-value settlement system should eliminate principal risk by linking the final settlement of one obligation to the final settlement of the other.*
2. *The settlement of two obligations can be achieved in several ways and varies by how trades or obligations are settled, either on a gross basis (trade-by-trade) or on a net basis, and the timing of when finality occurs.*

Explanatory text

3.12.1. The settlement of a financial transaction by an FMI may involve the settlement of two linked obligations, such as the delivery of securities against payment of cash or securities, or the delivery of one currency against delivery of another currency.⁸⁰ In this context, principal risk may be created when one obligation is settled, but the other obligation is not (for example, the securities are delivered but no cash payment is received). Because this principal risk involves the full value of the transaction, substantial credit losses as well as substantial liquidity pressures may result from the default of a counterparty or, more generally, the failure to complete the settlement of both linked obligations. Further, a settlement default could result in high replacement costs (that is, the unrealised gain on an unsettled contract or the cost of replacing the original contract at market prices that may be

⁷⁹ See also, CPSS, *Strengthening repo clearing and settlement arrangements*, September 2010.

⁸⁰ In some cases, the settlement of a transaction can be free of payment. Free of payment transfers for the purposes of pledging collateral and repositioning of securities are not inconsistent with this principle.

changing rapidly during periods of stress). An FMI should eliminate or mitigate these risks through the use of a DvP, DvD, or Pvp settlement mechanism.⁸¹

Linking final settlement of obligations

3.12.2. An FMI that is an exchange-of-value settlement system should eliminate principal risk by linking the final settlement of one obligation to the final settlement of the other. DvP, DvD, and Pvp settlement mechanisms eliminate principal risk by ensuring that the final settlement of one obligation occurs if and only if the final settlement of the linked obligation occurs. If an FMI effects settlements using a DvP, DvD, or Pvp settlement mechanism, it should settle a high percentage of obligations through that mechanism. In the securities market, for example, a DvP settlement mechanism is a mechanism that links a securities transfer and a funds transfer in such a way as to ensure that delivery occurs if and only if the corresponding payment occurs.⁸² DvP can and should be achieved for both the primary and secondary markets.

Gross or net settlement of obligations

3.12.3. The final settlement of two linked obligations can be achieved either on a gross basis (trade-by-trade) or on a net basis.⁸³ For example, a CSD can settle the transfers of both securities and funds on a gross basis throughout the settlement day. Alternatively, a CSD can settle securities transfers on a gross basis throughout the day, but settle funds transfers on a net basis at the end of the day or at certain times during the day. A CSD can also settle both securities and funds transfers on a net basis at the end of the day or at certain times during the day. Regardless of whether an FMI settles on a gross or net basis, the legal, contractual, technical, and risk-management framework should ensure that the settlement of an obligation is final if and only if the settlement of the corresponding obligation is final.

Timing of settlement

3.12.4. It is important to note that it is possible to achieve DvP, DvD, or Pvp through different types of timing arrangements. Strictly speaking, DvP, DvD, and Pvp do not require a simultaneous settlement of obligations. In some cases, settlement of one obligation could follow the settlement of the other. For example, when a CSD does not itself provide cash accounts for settlement, it may first block the underlying securities in the account of the seller.⁸⁴ The CSD may then request a transfer of funds from the buyer to the seller at the settlement bank for funds transfers. The securities are delivered to the buyer or its custodian if and only if the CSD receives confirmation of settlement of the cash leg from the settlement bank. In such DvP arrangements, however, the length of time between the blocking of securities, the settling of cash, and the subsequent release and delivery of the blocked

⁸¹ While DvP, DvD, and Pvp settlement mechanisms eliminate principal risk, they do not eliminate the risk that the failure of a participant could result in systemic disruptions, including liquidity dislocations.

⁸² Similarly, a Pvp settlement mechanism is a mechanism which ensures that the final transfer of a payment in one currency occurs if and only if the final transfer of a payment in another currency or currencies takes place. A DvD system is a securities settlement mechanism which links two securities transfers in such a way as to ensure that delivery of one security occurs if and only if the corresponding delivery of the other security occurs.

⁸³ For a discussion of stylised models of DvP settlement, see CPSS, *Delivery versus payment in securities systems*, September 1992.

⁸⁴ In this context, DvP could be achieved through a link between a CSD and a payment system. The CSD settles the securities leg of the transaction while the payment system settles the cash leg. However, in the context of these principles this arrangement is not considered an FMI link, but a DvP system.

securities should be minimised.⁸⁵ Further, blocked securities must not be subject to a claim by a third party (for example, other creditors, tax authorities, or even the CSD itself) because these claims would give rise to principal risk.

Extension of DvP, DvD, and PvP settlement to customers

3.12.5. An FMI that achieves DvP, DvD, or PvP enables its participants to offer DvP, DvD, or PvP settlement to their customers. For example, participants in a CSD or SSS with a DvP settlement mechanism could potentially allow their customers also to settle obligations on a DvP basis. This wider use of DvP settlement beyond direct participants in a CSD can reduce further the credit and liquidity risks in settlement within the broader financial markets. Cross-border links between CSDs also can be designed to permit DvP settlement of cross-border trades between participants in linked CSDs (see also principle 20 on FMI links).

Default management

An FMI should have appropriate policies and procedures to handle participant defaults, including appropriate arrangements for the segregation of participant assets and portability of customer assets. A participant default, if not properly managed, can have serious implications for the FMI, other participants, and the broader financial markets. The following set of principles provides guidance on (a) participant-default rules and procedures and (b) segregation and portability.

Principle 13: Participant-default rules and procedures

An FMI should have effective and clearly defined rules and procedures to manage a participant default that ensure that the FMI can take timely action to contain losses and liquidity pressures, and continue to meet its obligations.

Key considerations

1. *An FMI should have default rules and procedures that enable the FMI to continue to meet its obligations in the event of a participant default and that address the replenishment of resources following a default.*
2. *An FMI should be well prepared to implement its default rules and procedures, including the exercise of any appropriate discretionary procedures provided in its rules.*
3. *An FMI should make key aspects of its default rules and procedures available to the public.*
4. *An FMI should engage with its participants and other relevant stakeholders in the periodic testing and review of its default procedures to ensure that they are practical and effective.*

Explanatory note

3.13.1. Participant-default rules and procedures facilitate the continued functioning of an FMI in the event that a participant fails to meet its obligations and help to limit the potential for the effects of a participant's failure to spread to other participants. Key objectives of default rules and procedures should include (a) ensuring timely completion of settlement,

⁸⁵ A CSD that settles securities transactions on a net basis with an end-of-day finality arrangement could meet this requirement by providing a mechanism that allows intraday finality.

even in extreme but plausible market conditions; (b) minimising further losses at the FMI, other participants and the customers of the defaulting participant; (c) limiting disruptions to the market; (d) providing a clear framework for accessing FMI liquidity facilities as needed; and (e) managing and closing out the defaulting participant's positions and liquidating any applicable collateral in a prudent and orderly manner. In some instances, managing a participant default may involve hedging open positions, funding collateral so that the positions can be closed out over time, or both. An FMI may also decide to auction or allocate open positions to its participants.⁸⁶ To the extent consistent with these objectives, an FMI should allow other participants to continue managing their positions as normal.

Rules and procedures

3.13.2. An FMI should explain clearly in its rules and procedures what constitutes a participant default, addressing both a financial and an operational default of a participant.⁸⁷ An FMI should describe the method for identifying a default, and, in particular, specify whether the default is declared automatically or whether a specific decision must be made. Other key aspects of the rules and procedures include (a) the actions that an FMI can take when a default is declared; (b) the extent to which the actions are automatic or discretionary; (c) changes to normal settlement practices; (d) the management of transactions at different stages of processing; (e) the expected treatment of proprietary and customer transactions and accounts; (f) the probable sequencing of actions; (g) the roles, obligations, and responsibilities of the various parties, including non-defaulting participants; and (h) the existence of other mechanisms that may be activated to contain the impact of a default. An FMI should engage with its participants and other relevant stakeholders in developing its default rules and procedures (see principle 2 on governance).

Use and sequencing of financial resources

3.13.3. An FMI's participant-default rules and procedures should enable the FMI to take timely action to contain losses and liquidity pressures, before, at, and after the point of participant default (see also principle 4 on credit risk and principle 7 on liquidity risk). Specifically, an FMI's rules and procedures should allow the FMI to use promptly any financial resources that it maintains for covering losses and containing liquidity pressures arising from default, including the use of liquidity facilities. The rules of the FMI should specify the order in which different types of resources will be used. This information enables participants to assess their potential future exposures from using the FMI's services. Typically, an FMI should first use assets posted by the defaulting participant, such as collateral and margin, to provide incentives for participants to manage prudently the risks, particularly credit risk, they pose for an FMI.⁸⁸ The application of previously posted collateral should not be subject to prevention, stay, or reversal under applicable law and the rules of the FMI. The rules and procedures should also address the replenishment of resources following a default.

⁸⁶ An OTC derivatives CCP may need to consider requiring participants to agree in advance to bid on the defaulting participant's portfolio and, should the auction fail, accept an allocation of the portfolio. A CCP that employs such procedures should carefully consider, where possible, the risk profile and portfolio of the receiving participant before allocating positions so as to minimise additional risk for the surviving participant.

⁸⁷ An operational default occurs because a participant is not able to meet its obligations due to an operational problem, such as a failure in information technology systems.

⁸⁸ See principle 5 on collateral and principle 6 on margin.

Proprietary and customer positions

3.13.4. A CCP should have rules and procedures to facilitate the prompt close out or transfer of a defaulting participant's proprietary and customer positions. The longer these positions remain open on the books of the CCP, the larger typically will be the CCP's potential credit exposures resulting from changes in market prices or other factors. A CCP should have the ability to apply the proceeds of liquidation, along with other funds and assets of the defaulting participant, to meet the defaulting participant's obligations. It is critical that a CCP has the authority to act promptly in the manner it thinks is best to contain its exposure, whilst having regard to overall market effects, such as sharp declines in market prices. A CCP should have the information, resources, and tools to close out positions promptly. In circumstances where prompt close-out is not practicable, a CCP should have the tools to hedge positions as an interim risk-management technique. In some cases, a CCP may use staff from non-defaulting participants to assist in the close-out or hedging process. The CCP's rules and procedures should clearly state the scope of duties and term of service expected from seconded staff. In other cases, the CCP may elect to auction positions or portfolios to the market. The CCP's rules and procedures should clearly state the scope for such action, and any and all obligations faced by participants with regard to such auctions should be clearly set out. As with the application of posted collateral, the close out of positions should not be subject to prevention, stay or reversal under applicable law and the rules of the FMI.

Management discretion

3.13.5. An FMI's management should be well prepared and have sufficient discretion to implement default procedures in a flexible manner so that the FMI's activities do not lead to additional systemic risks in the market. Management also should ensure that the FMI has the operational capacity, including sufficient and well-trained personnel, needed to implement its procedures in a timely manner. An FMI's rules and procedures should indicate the circumstances when management can exercise discretion and include appropriate arrangements to minimise any conflicts of interest that may arise. Management should also have internal plans that clearly delineate the roles and responsibilities for addressing a default, and provide training and guidance to its staff on how the procedures should be implemented. The plans should address documentation, information needs, and coordination when more than one FMI or authority is involved. In addition, timely communication with stakeholders, in particular regulators, supervisors, and overseers, is of critical importance. The FMI, to the extent permitted, should clearly convey information that would help those affected to manage their own risks. The internal plan should be reviewed by management and the relevant board committees at least once a year, or after any significant changes to the FMI's arrangements.

Public disclosure

3.13.6. To provide certainty and predictability regarding the measures that an FMI may take in a default event, an FMI should make available to the public key aspects of its default procedures, including: (a) the circumstances in which action may be taken; (b) who may take those actions; (c) the scope of the actions which may be taken, including the treatment of both proprietary and customer positions, funds and assets; (d) the mechanisms to address an FMI's obligations to non-defaulting participants; and (e) the mechanisms to help address the defaulting participant's obligations to its customers. This transparency helps the orderly handling of defaults, enables participants to understand their obligations to the FMI and to their customers, and gives market participants the information they need to make informed decisions about their activities in the market. An FMI should ensure that its participants and their customers, as well as the public, have appropriate access to the FMI's default procedures, and promote the understanding of those procedures in order to foster confidence in the market in the event of a participant default.

Periodic testing and review of participant-default procedures

3.13.7. An FMI should establish a programme to test and review periodically its participant-default procedures to ensure that they are both practical and effective. The periodic testing and review of default procedures is important to help the FMI and its participants to understand the procedures fully and to identify any uncertainty due to the rules and procedures or discretion allowed by the rules and procedures. Such tests should include all relevant parties, or an appropriate subset, that would likely be involved in the default procedures, such as members of the appropriate board committees, participants, interdependent FMIs, and any related service providers. This is particularly important where an FMI relies on non-defaulting participants or third parties to assist in the close out process and where the default procedures have never been tested by an actual default.

Principle 14: Segregation and portability

A CCP should have rules and procedures that enable the segregation and portability of positions and collateral belonging to customers of a participant.

Key considerations

- 1. A CCP should have segregation and portability arrangements that protect customer positions and collateral to the greatest extent possible under applicable law, particularly in the event of a default or insolvency of a participant.*
- 2. A CCP should employ an account structure that enables it readily to identify and segregate positions and collateral belonging to customers of a participant. Such CCPs should maintain customer collateral and positions in an omnibus account or in individual accounts at the CCP or at its custodian.*
- 3. A CCP should structure its arrangements in a way that facilitates the transfer of the positions and collateral belonging to customers of a defaulting participant to one or more other participants.*
- 4. A CCP should clearly disclose its rules, policies, and procedures relating to the segregation and portability of customer positions and collateral. In addition, a CCP should disclose any constraints, such as legal or operational constraints, that may impair its ability fully to segregate or port customer positions and collateral.*

Explanatory note

3.14.1. The segregation of customers' positions and collateral plays an important part in the safe and effective holding and transfer of customers' positions and collateral especially in the event of a participant's default or insolvency. Segregation refers to a method of protecting customer collateral and contractual positions by holding or accounting for them separately from those of the direct participant (such as a carrying firm or broker). Effective segregation arrangements can reduce the impact of a participant's insolvency on its customers by providing for clear and reliable identification of customer positions and collateral. Segregation also protects a customer's collateral from becoming unavailable or permanently lost as a result of a participant's insolvency. In addition, segregation facilitates the transfer of customers' positions and collateral. Even if no transfers take place, segregation can improve a customer's ability to identify and recover its collateral, which, at least to some extent, contributes to retaining customers' confidence in their clearing participants and may reduce the potential for "counterparty runs" on a deteriorating clearing participant.

3.14.2. Portability refers to the operational aspects of the transfer of contractual positions, funds, or securities from one party to another party by means of a conveyance of money or financial instruments. In addition to facilitating transfers, effective portability arrangements

bring the added benefit of lessening the need for closing out positions including during times of market stress, minimising associated costs and market disruption, and reducing possible impact on customers' ability to continue to obtain access to central clearing.

3.14.3. Effective segregation and portability of customers' positions and collateral depends not only on the measures taken by a CCP itself but also on applicable legal frameworks, including those in foreign jurisdictions in the case of remote participants, and measures taken by other parties, to the extent customers' collateral is held partly or wholly at the participant level (as opposed to the CCP level) or by other third parties.

Legal framework

3.14.4. In order fully to achieve the benefits of segregation and portability the legal framework applicable to the CCP should support its arrangements to protect the positions and collateral of a participant's customers.⁸⁹ The legal framework will influence how the segregation and portability arrangements are designed, and, therefore, what benefits can be achieved. The relevant laws will vary depending upon many factors, including the participant's legal form of organisation, the manner in which collateral is posted (security interest or title transfer), and the types of assets (cash or securities) posted as collateral. Therefore, it is not possible to design a single model appropriate for all CCPs across all jurisdictions. However, a CCP should structure its segregation and portability arrangements in a manner that protects the interest of a participant's customers and achieves a high degree of legal certainty under applicable law. A CCP should also consider potential conflict-of-law issues when designing its arrangements. Moreover, the CCP's rules and procedures that set out its segregation and portability arrangements should avoid any potential conflict with existing segregation and portability regulations applicable to a participant.

Customer accounts

3.14.5 The segregation and portability principle is particularly relevant for a CCP that clear positions and hold collateral belonging to customers of a participant.⁹⁰ This structure allows customers (such as buy-side firms) that are not direct participants of a CCP to obtain access to central clearing where direct access is either not desirable (for example, due to cost or location) or possible (for example, membership criteria). A CCP should employ an account structure that enables it to readily identify and segregate positions and collateral belonging to customers of a participant. Segregation of customer collateral can be achieved in different ways, including through individual or omnibus accounts that may be held at the CCP, a third party custodian, or the participant.⁹¹ There are advantages and disadvantages to each type of account structure that the CCP should consider when designing its segregation regime. The degree of protection achievable for customer collateral will depend on the account structure offered (individual or omnibus) and the way margin is collected (gross or net basis) by the CCP.

3.14.6. The individual account structure provides a high degree of protection to customers of participants in CCPs. Under this approach, each customer's collateral is held in a

⁸⁹ For example, portability arrangements could be undermined if applicable insolvency laws do not permit the transfer of positions and collateral as contemplated by the CCP. Also, in some jurisdictions, it may not be possible to segregate cash.

⁹⁰ This principle generally covers all types of CCPs. However, in the case of some CCPs for cash markets, domestic law enables segregation and portability by alternative means. In these jurisdictions, the CCP and relevant authorities should evaluate the extent to which the CCP should revise its operations and adopt rules and procedures that enable segregation and portability in conformity with this principle.

⁹¹ If the third party custodian qualifies as a CSD, then principle 11 on CSDs and principle 16 on custody and investment risk also apply.

separate, individual account and, depending on the legal framework applicable to a CCP, a customer's collateral may only be used to cover losses associated with the default of that customer. This account structure also facilitates the clear and prompt identification of a customer's collateral which can expedite the return of collateral to the customer, and supports full portability of an individual customer's positions and collateral. Since all collateral maintained in the individual customer's account is used to margin that customer's positions only, the CCP should be able to transfer these positions from a defaulting participant to another participant with sufficient collateral to cover the exposures. By using individual accounts, and collecting on a gross margin basis, the CCP may have more flexibility in how it ports a customer's portfolio to another participant or group of participants. Maintaining individual accounts, however, can be operationally and resource intensive for the CCP or its custodian in settling transactions and ensuring accurate bookkeeping. This approach could impact the overall efficiency of the CCP's operations. The advantages of maintaining individual accounts may vary depending upon the legal framework applicable to the insolvency of a CCP participant.

3.14.7. Another approach would be to use an omnibus account structure where all collateral belonging to all customers of a particular participant is commingled and held in a single account. This approach can be less operationally intensive, can increase efficiency in porting positions and collateral for a group of customers of a defaulting participant, and can be structured to protect customers' collateral from being used to cover a default by a direct participant. Omnibus accounts, however, do require the CCP or direct participant to maintain accurate books in order to promptly ascertain an individual customer's interest to a portion of the collateral. A failure to do so can lead to delays or even losses in returning margin and other collateral to individual customers in the event a participant becomes insolvent.⁹² In designing its segregation regime, a CCP should consider both the advantages and disadvantages of the omnibus account structure.

3.14.8. The degree of protection for a customer whose assets are held in an omnibus account varies depending on whether the CCP collects margin on a gross or net basis. Like account structure, there are advantages and disadvantages to the way margin is collected by the CCP. While margin calculated on a gross basis to support individual customer portfolios results in less netting efficiency, it is likely to preclude the possibility of under-margined customer positions when ported. As a result, CCP can port customer positions and related margin in bulk or piecemeal. Gross margining enhances the feasibility of portability, which is desirable since porting avoids the transactions costs, including bid-offer spreads, associated with terminating and replacing customer positions. When margin is collected on a gross basis, there should be sufficient collateral in the omnibus account to cover all customers' positions of the participant holding the account on a portfolio basis.⁹³

3.14.9. When margin is collected by the CCP on a net basis but held in an omnibus account structure, there is a risk that full portability cannot be achieved.⁹⁴ Since the collateral maintained in the omnibus account covers the net positions across all customers of a particular participant, upon the default of a participant, the excess collateral maintained by the defaulting participant may not be readily available for margining customer's positions on a forward basis. Other than a bulk transfer of all customer positions of the defaulting or insolvent direct participant, any transfer of a customer's positions to another participant

⁹² Ascertaining margin will usually require reliance on the participant's records containing the sub-accounting for individual customers.

⁹³ Although portability on a portfolio basis has historically been feasible, it is possible that such portability may not be achievable, perhaps due to stressed market conditions, or the complexity or size of the portfolio, or lack of information on the individual constituents.

⁹⁴ Collateral exceeding the net positions is often maintained by the participant.

would depend on the ability and willingness of customers to provide additional collateral. Otherwise, porting individual customer portfolios, with their pro rata share of net margin, to multiple transferee clearing members is likely to result in under-margined customer positions. Transferee clearing members are unlikely to take those positions unless the margin shortfall is remedied by the customer.⁹⁵

3.14.10. A CCP should design its segregation regime in a manner that provides customers with legal certainty that their collateral will be protected to the greatest extent possible under applicable law. The CCP should maintain collateral supporting customer positions in an omnibus account or in individual accounts at the CCP or its custodian. A CCP should consider offering individual customer account segregation given the additional customer protection benefits. In considering whether or not to offer individual customer accounts, the CCP should take into account all relevant circumstances. Such circumstances include applicable insolvency regimes, cost of implementation, and risk-management challenges associated with the use of individual customer accounts. If the CCP determines that individual customer accounts should be offered, then the CCP should offer them at reasonable cost and in an unrestrictive manner and require direct participants to offer those accounts to their customers at a reasonable cost and in an unrestrictive manner.⁹⁶ In addition, assets held by the participant should be limited to any excess collateral posted by the customer beyond that which is required by the CCP to cover its exposures.

3.14.11. The customer protection benefits of segregation are not limited to customer collateral that has been posted or transferred to the CCP or its custodian. The benefits may also extend to collateral that customers post or transfer directly to participants. In designing its segregation arrangements, a CCP should be mindful of laws or regulations that require a participant to segregate all customer collateral and endeavour to take steps to ensure its segregation arrangements are consistent with those laws and regulations. In the absence of such a legal or regulatory segregation requirement, the CCP should consider requiring participants to segregate positions and collateral belonging to customers to the fullest extent possible.

Transfer of positions and collateral

3.14.12. Efficient and complete portability of customer positions and collateral is important in both pre-default and post-default scenarios, but is particularly critical when a participant defaults or is undergoing insolvency proceedings.⁹⁷ A CCP's ability to transfer the positions and collateral belonging to customers in a timely manner may depend on such factors as market conditions, sufficiency of information on the individual constituents, and the complexity or sheer size of the portfolio. A CCP should therefore structure its portability arrangements in a way that facilitates the transfer of the positions and collateral of the customers of a defaulting participant to one or more other participants, taking into account all relevant circumstances. A CCP's rules and procedures should require participants to facilitate the transfer of customer positions and collateral upon the customer's request,

⁹⁵ A net margining regime may require a CCP to transfer all net positions and net margin as a block to another participant. Otherwise, porting individual customer portfolios, with their pro rata share of net margin, to multiple transferee clearing members is likely to result in under-margined customer positions. Transferee clearing participants are unlikely to take those positions unless the margin shortfall is remedied by the customer.

⁹⁶ Where collateral is maintained by a third-party custodian, the CCP should evaluate whether any agreements are needed between customers and the custodian regarding the treatment of customer assets in the event of a participant default.

⁹⁷ A customer should also be able to transfer its positions and collateral to another participant in the normal course of business (for example, relationship with a new clearing firm or merger of entities), subject to applicable laws and contractual terms. In addition, portability arrangements can also facilitate an orderly wind down of a participant.

subject to any notice or other contractual requirements. The CCP should obtain the consent of the direct participant to which positions and collateral are ported. If there are circumstances where this would not be the case, they should be set out clearly in the CCP's rules, policies, or procedures. A CCP's policies and procedures also should provide for the proper handling of positions and collateral of customers of a defaulting participant.⁹⁸

Disclosure

3.14.13. A CCP should clearly state its segregation and portability arrangements in its rules, policies, and procedures.⁹⁹ A CCP's disclosure should be adequate such that customers can clearly understand how much customer protection is provided, how segregation and portability are achieved, and any risks or uncertainties associated with such arrangements. Disclosure would assist customers to assess the related risks and conduct due diligence when entering into transactions that are cleared or settled through a direct participant in the CCP. Customers should have sufficient information about which of its positions and collateral held at a CCP (or its custodian) are segregated from positions and collateral of the participant and the CCP. Disclosure regarding segregation should include: whether the segregated assets are reflected on the books and records at the CCP, direct participant, or unaffiliated third-party custodians that hold assets for CCPs or direct participants; who holds the customer collateral (for example, the direct participant, CCP, or third-party custodian); and under what circumstances may customer collateral be used by the CCP.¹⁰⁰

General business and operational risk management

In addition to the credit, liquidity, and other related risks that it faces from its clearing and settlement activity, an FMI also faces general business and operational risks. The inability of an FMI to continue as a going concern could pose systemic risk to its participants and the broader financial markets. The following set of principles provides guidance on managing general business risk, custody and investment risk, and operational risk.

Principle 15: General business risk

An FMI should identify, monitor, and manage its general business risk and hold sufficiently liquid net assets funded by equity to cover potential general business losses so that it can continue providing services as a going concern. This amount should at all times be sufficient to ensure an orderly wind-down or reorganisation of the FMI's critical operations and services over an appropriate time period.

Key considerations

- 1. An FMI should have robust management and control systems to identify, monitor, and manage general business risks, including business strategy, cash flows, and operating expenses.*
- 2. An FMI should hold sufficient equity or equity capital, in the form of shareholders' funds (such as common stock, disclosed reserves, or retained earnings), to cover potential general business losses, so that it can continue providing services as a going concern. Resources held to cover potential general business losses should be in addition to*

⁹⁸ See also principle 13 on participant-default rules and procedures.

⁹⁹ See principle 23 on disclosure of rules and procedures.

¹⁰⁰ See also principle 16 on custody and investment risk.

resources held to cover participant defaults or other risks covered under financial resource principles.

3. *At a minimum, an FMI should hold equity capital at normal times equal to [six, nine, or twelve] months of expenses. An FMI may also need to hold additional equity capital, taking into account its general business risk profile. Capital held under international risk-based capital standards should be included where relevant and appropriate to avoid double regulation.*
4. *In addition to capital adequacy, an FMI's equity capital should reflect a strong cash, cash-equivalent, or securities position to allow the FMI to meet its current and projected operating expenses under a range of scenarios; cash equivalents and securities should consist of high-quality and sufficiently liquid assets that can easily be converted into cash at little or no loss of value, even in adverse market conditions.*
5. *An FMI should maintain a viable plan for (a) raising additional capital should its equity capital approach or fall below the minimum; and (b) if the FMI is unable to raise new capital, achieving an orderly wind down or reorganisation of its operations and services. This plan should be approved by the board of directors (or an appropriate board committee), updated regularly, and reviewed by the FMI's regulator, supervisor, or overseer.*

Explanatory note

3.15.1. An FMI bears certain risks and potential losses, related to its administration and operation as a business enterprise (that is, general business risks), that are not related to participant default or separately covered by financial resources under the credit or liquidity risk principles. General business risk refers to any potential impairment of the financial position (as a business concern) of an FMI as a consequence of a decline in its revenues or growth in its expenses, such that expenses exceed revenues and result in a loss that must be charged against capital. Such impairment can be caused by a variety of business factors, such as poor execution of business strategy, an ineffective response to competition, losses in other business lines of the FMI or its parent, changes to the regulatory environment, or reputational events. Business-related losses also may arise from risks covered by other principles, for example, legal risk (such as legal actions against the FMI's custody arrangements), investment risk of the FMI's resources, or operational risk (such as fraud, theft, or loss).¹⁰¹ An FMI should have robust management and control systems to identify, monitor, and manage its general business risk.

Identifying business risk

3.15.2. An FMI should identify the sources of business risk and their potential impact on its on-going and critical business functions, taking into account past loss events and financial projections. An FMI should assess and thoroughly understand its business risk and the potential effect that this risk could have on its cash flow, liquidity, and capital positions. Although it is difficult to specify or quantify, an FMI should also consider the likelihood of potential adverse effects on its revenue or expenses and the impact of those potential effects. When planning an expansion of activity, an FMI should conduct a comprehensive enterprise risk assessment. In particular, for any major new product, service, or project that the FMI considers, it should project potential revenues and expenses and identify any additional capital requirements.

¹⁰¹ See also principle 1 on legal basis, principle 16 on custody and investment risk, and principle 17 on operational risk.

3.15.3. In identifying and assessing business risk, an FMI should consider a combination of tools, such as risk management and internal control assessments, scenario analysis, and sensitivity analysis. Internal control assessments should identify key risks and controls, and assess the impact and probability of the various risks and the effectiveness of controls. Scenario analysis examines how a specific scenario would affect the FMI. Sensitivity analysis tests how the change in one risk would affect the FMI's financial standing, for example, considering how the loss of a key customer or service provider might be compounded or mitigated by the FMI's existing business activities. In some cases, an FMI may want to consider an independent assessment of specific business risks.

3.15.4. An FMI should clearly understand its general business risk profile so that it is able to assess its ability either to avoid, reduce, or transfer specific business risks, or to retain, manage, and accept those business risks. This requires the ongoing identification of risk-mitigation options that the FMI may choose in response to changes in its business environment. For example, some risks may be eliminated or mitigated by appropriate internal controls, while other risks may be insured or indemnified by a third party or retained by the FMI.

Measuring and monitoring business risk

3.15.5. Once the FMI has identified and assessed its business risk, an FMI should measure and monitor specific risks on an ongoing basis and develop appropriate information systems as part of a robust enterprise risk-management program. Key components include establishing strong financial and internal control systems so that the FMI can monitor, manage, and control its cash flows and operating expenses, and mitigate any business-related losses (see principle 3 on framework for the comprehensive management of risks). In particular, an FMI should take actions to minimise and mitigate the probability and impact of business-related losses on its operations across a range of adverse business and market conditions. An FMI should also ensure that it has rigorous and appropriate investment guidelines and monitoring procedures (see principle 16 on custody and investment risk).

Maintaining sufficient equity capital

3.15.6. An FMI should hold sufficient liquid net assets funded by equity capital to cover potential losses associated with its general business risk, so that it can continue providing services as a going concern.¹⁰² Equity capital, in the form of shareholders' funds (such as common stock, disclosed reserves, or retained earnings), allows an FMI to absorb losses on an ongoing basis and should be permanently available for this purpose. At a minimum, an FMI should hold equity capital at normal times equal to [six, nine, or twelve] months of expenses, but the FMI should also consider whether resources are required beyond that amount, taking into account its general business risk profile. More capital may be necessary to meet identified risks in specific cases, depending upon the size of the FMI and the scope of its activities. Capital that is held to cover risks or losses other than business risk (for example, the financial resources required under the credit and liquidity risk principles, should not be included when accounting for capital available to cover business risk. Capital held under international risk-based capital standards, however, may be included where relevant to avoid duplicative regulation.

3.15.7. Cash received from raising equity capital and held for business risk purposes should be held in sufficiently liquid assets. Assets should be in the form of cash, cash equivalent, or

¹⁰² In exceptional circumstances, if the corporate structure of an FMI is such that it cannot legally raise equity capital (for example under certain structures of mutual ownership or where the FMI is run by a central bank), or the FMI is a new start-up and cannot initially raise the required level of equity capital, it should ensure an equal amount of equivalent loss absorbing financial resources are available.

securities that are sufficiently liquid to allow the FMI to meet its current and projected operating expenses under a range of scenarios. Cash equivalents and securities should be easily converted into cash at little or no loss of value, even in adverse market conditions. To the extent possible under the relevant jurisdictions, any assets or capital that are dedicated to covering any resulting participant default losses, or to cover losses from other (more risky) business lines that are unrelated to their activities as an FMI, should not be considered in assessing the adequacy of resources covering business risk.¹⁰³ To ensure the adequacy of its own resources, an FMI should regularly assess and report its capital relative to its potential business risks to its regulators.

Establishing a viable capital plan to avoid systemic disruption

3.15.8. An FMI should develop and maintain a viable capital plan in order to ensure an appropriate level of capital. The capital plan should specify how an FMI would raise new capital if its equity capital approaches or falls below the minimum, and (should it be unable to raise new capital) how the FMI could achieve an orderly wind-down or reorganisation of its critical operations and services in a way that avoids any systemic disruption to the markets or institutions supported by the FMI.¹⁰⁴ Any wind-down or reorganisation plan should take into account both the financial resources needed by the FMI to continue to operate during the wind-down or reorganisation period, and the time needed by the FMI's participants to adjust to the implementation and financial impact of these changes. This plan should be updated regularly and approved by the board of directors (or an appropriate board committee). It should be reviewed by the FMI's regulator, supervisor, or overseer. An FMI may also need to consult its participants and others during the development of its plan.

3.15.9. In developing a capital plan, an FMI may consider a number of factors, including its ownership structure and any insured business losses. For example, an FMI should determine if and to what extent specific potential business losses are covered by (a) explicit insurance from a third party or (b) explicit indemnity agreements from a parent, owners, or participants (for example, general loss-allocation provisions and parent guarantees) which would be realisable within the wind-down or reorganisation time frame. Given the contingent nature of these resources, an FMI should use conservative assumptions when taking them into account for its capital plan. Furthermore, these resources should not be taken into account when assessing the capital adequacy of the FMI.

3.15.10. The appropriate level of equity capital to be held by an FMI for an orderly wind-down or reorganisation will differ based on the length of time (and hence the amount of financial resources needed) to complete the wind down or reorganisation. The FMI should take into consideration the operational, technological, and legal requirements for participants to move to or establish an alternative arrangement in the event of such a wind down or reorganisation. In order to estimate the amount of capital it would need during the considered time horizon, an FMI should regularly analyse and understand how its cash flow and operating expenses may change under a variety of adverse business scenarios. This analysis should be performed regularly, as well as when a material change to the assumptions occurs, either because of changes to the FMI's business model or because of external changes.

¹⁰³ Depending on the rules of the particular FMI and the insolvency law of the jurisdiction in which it is established, the capital of an FMI may ultimately be used if the resources that form the default backing are insufficient to cover the losses generated in the event of a participant default.

¹⁰⁴ Reorganising could include recapitalising, replacing management, merging with another FMI, revising business strategies (including cost or fee structures), or restructuring services provided.

Principle 16: Custody and investment risk

An FMI should safeguard its assets and minimise the risk of loss or delay in access to those assets, including assets posted by its participants. An FMI's investments should be in instruments with minimal credit, market, and liquidity risks.

Key considerations

- 1. An FMI should hold its assets, including assets that its participants have posted to it, at supervised and regulated entities that have robust accounting practices, safekeeping procedures, and internal controls that fully protect these assets.*
- 2. An FMI should have prompt access to its assets, including assets posted by participants, when required.*
- 3. An FMI's investment strategy should be consistent with its overall risk-management strategy, and investments should be secured by, or be claims on, high-quality obligors. These investments should allow for quick liquidation with little, if any, adverse price effect.*

Explanatory note

3.16.1. An FMI has the responsibility to safeguard its assets, such as cash and securities, including assets that its participants have posted to the FMI. Custody risk is the risk of loss on assets held in custody in the event of a custodian's (or subcustodian's) insolvency, negligence, fraud, poor administration, or inadequate recordkeeping. Assets that are used by an FMI to support its operating funds, capital funds, or that have been posted by participants to secure their obligations to the FMI, should be held at supervised or regulated entities that have strong processes, systems, and credit profiles. In addition, assets should generally be held in a manner that assures the FMI prompt access to those assets in the event that an FMI needs to draw on them. Investment risk refers to the risk of loss faced by an FMI when it invests its own resources or cash margin posted by its participants in obligations with market, credit, and liquidity risks.

Use of custodians

3.16.2. An FMI should mitigate its custody risk by only using supervised and regulated entities with robust accounting practices, safekeeping procedures, and internal controls that fully protect the assets against the risk of the custodian's insolvency, negligence, misuse of assets, fraud, poor administration, or inadequate recordkeeping. It is particularly important that assets held in custody are protected against claims of a custodian's creditors. The custodian should have a sound legal basis supporting its activities, including the segregation of assets.¹⁰⁵ The custodian also should have a strong financial position to be able to sustain losses from operational problems or non-custodial activities. An FMI should confirm that its interest or ownership rights in the assets can be enforced and that it can have prompt access to them when required. Timely availability and access should be ensured even if these securities are held in another time zone or jurisdiction. Furthermore, the FMI should confirm it has prompt access to the assets in the event of a default of a participant.

3.16.3. An FMI should evaluate and understand its exposures to its custodian banks, taking into account the different relationships with each custodian bank. For example, a financial institution may serve as a custodian bank to an FMI as well as a settlement bank and liquidity provider to the FMI. The custodian bank also might be a participant in the FMI and offer

¹⁰⁵ See principle 14 on segregation and portability.

clearing services to other participants. An FMI should carefully consider all of its relationships with a particular custodian bank to ensure that its overall risk exposure to an individual custodian remains within acceptable concentration limits. Where feasible, an FMI could consider using multiple custodians for the safekeeping of its assets to diversify its exposure to any single custodian. For example, a CCP may want to use one custodian for its margined assets and another custodian for its prefunded default arrangement. A CCP, however, may need to balance the benefits of risk diversification against the benefits of pooling resources at one or a small number of custodians. In any event, an FMI should monitor the concentration of risk exposures to, and financial condition of, its custodian banks on an ongoing basis.

Investing participant assets

3.16.4. In addition to making decisions on its own resources, in some cases, an FMI may make investment decisions on the cash or securities that participants have posted. An FMI's investment risk-management strategy for investing participants' assets should be consistent with its overall risk-management strategy and fully disclosed to its participants. Further, an FMI's investments should be secured or should be claims on high-quality obligors to mitigate the credit risk to which an FMI is exposed.¹⁰⁶ An FMI should carefully consider its overall credit risk exposures to individual obligors including other relationships with the obligor that create additional exposures, such as an obligor that is also a participant or an affiliate of a participant in the FMI. In addition, an FMI should not invest participant assets in its own securities or those of its affiliates. If an FMI's own resources can be used to cover losses and liquidity pressures resulting from a participant default, the investment of those resources should not compromise its ability to use them when needed.¹⁰⁷ Because the value of an FMI's investments may need to be realised quickly, investments should allow for quick liquidation with little, if any, adverse price effect.

Principle 17: Operational risk

An FMI should identify all plausible sources of operational risk, both internal and external, and minimise their impact through the deployment of appropriate systems, controls, and procedures. Systems should ensure a high degree of security and operational reliability, and have adequate, scalable capacity. Business continuity plans should aim for timely recovery of operations and fulfilment of the FMI's obligations, including in the event of a wide-scale disruption.

Key considerations

- 1. An FMI should establish a robust operational risk-management framework with appropriate systems, policies, procedures, and controls to identify, monitor, and manage operational risks.*
- 2. The roles and responsibilities for operational risk should be clearly defined within the FMI, and the FMI's operational risk-management framework should be endorsed by the FMI's board of directors. Risks, operational policies and procedures, and systems should be reviewed, audited, and tested periodically and after significant changes.*
- 3. An FMI should have clearly defined operational reliability objectives and should have policies in place that are commensurate with those objectives. An FMI should have*

¹⁰⁶ For example, an FMI could invest in reverse repos backed by highly rated and liquid securities on an overnight basis.

¹⁰⁷ Some FMI resources will be invested in physical assets such as computers and buildings, which are not the subject of this principle.

adequate capacity and scalability, as well as the tools and procedures to monitor the performance of the FMI.

4. *An FMI should have well-defined physical and information security policies. All potential vulnerabilities and threats should be investigated, assessed, and documented.*
5. *An FMI should have a business continuity plan that addresses events posing a significant risk of disrupting operations, including events that could cause a wide-scale disruption. The plan should incorporate the use of a secondary site and should ensure that critical information technology (IT) systems can resume operations within two hours following disruptive events. In case of extreme circumstances, settlement should be ensured by the end of the day at the latest. The FMI should plan and carry out a programme of tests of these arrangements.*
6. *An FMI should identify, monitor, and manage the risks that key participants, other FMIs, and service and utility providers might pose to its operations. In addition, an FMI should identify, monitor, and manage the risks its operations might pose to other FMIs.*

Explanatory note

3.17.1. Operational risk is the risk that deficiencies in information systems, internal processes, and personnel, or disruptions from external events will result in the reduction, deterioration, or breakdown of services provided by an FMI. Operational failures can damage an FMI's reputation or perceived reliability, lead to legal consequences and result in financial losses incurred by the FMI, participants, and other parties. In certain cases, operational failures can also be a source of systemic risk. An FMI should establish a robust framework to manage its operational risks. As part of an FMI's operational risk-management framework, the FMI should identify all plausible sources of operational risk; deploy appropriate systems; establish appropriate policies, procedures, and controls; set operational reliability objectives; and develop a business continuity plan. An FMI should take a holistic approach when establishing its operational risk-management framework.

Identifying sources of operational risk

3.17.2. An FMI should actively identify, monitor, and manage all plausible sources of operational risk and establish clear policies and procedures to address them. Operational risk can stem from both internal and external sources. Internal sources of operational risk include inadequate identification or understanding of risks and the controls and procedures needed to limit and manage them, inadequate control of systems and processes, inadequate screening of personnel, and, more generally, inadequate management. External sources of operational risk include events affecting a wide metropolitan area such as natural disasters, terrorism, and pandemics. Both internal and external sources of operational risk can lead to a variety of operational failures that include: (a) errors or delays in message handling, (b) miscommunication, (c) service degradation or interruption, (d) fraudulent activities by staff, and (e) disclosure of confidential information to unauthorised entities. If an FMI provides services to multiple jurisdictions or in multiple time zones, it may face increased operational risks. An FMI should identify all potential single points of failure in its operations. Additionally, an FMI should assess the evolving nature of the operational risks it faces on an on-going basis (for example, pandemics and cyber attacks), so that it can analyse its potential vulnerabilities and implement appropriate defence mechanisms.

3.17.3. A TR typically serves as a single source of information for a particular market, and it may be the central registry for certain trades. Therefore, a TR's failure to perform as expected could cause significant disruption. The key risk of a TR is operational. Deficiencies in business continuity arrangements, data integrity, and the safeguarding of data are a particular concern. Inadequate disclosure or faulty delivery of data by a TR to relevant authorities or the public could undermine the primary purpose of the TR. Access to timely and reliable data provides greater insights into the derivatives market and improves the

ability of relevant authorities to oversee the markets it serves and its participants. Data recorded by a TR may also be utilised as input by the TR's participants and potentially by other relevant infrastructures and service providers. Therefore, continuous availability of data stored in a TR is critical.

Operational risk management

3.17.4. An FMI should establish clear policies, procedures, and controls that mitigate and manage its sources of operational risk. Overall, operational risk management is a continuous process encompassing risk assessment, defining an acceptable tolerance for risk, and implementing risk controls. This process results in an FMI accepting, mitigating, or avoiding risks. To ensure the proper functioning of its risk controls, an FMI should have sound internal controls. For example, an FMI should have adequate management controls, such as setting operational standards, measuring and reviewing performance, and correcting deficiencies. There are many relevant international, national and industry-level standards, guidelines, or recommendations that an FMI may use in designing its operational risk-management policy. Conformity with commercial standards can help an FMI reach its operational objectives. For example, commercial standards exist for information security, business continuity, and project management. An FMI should regularly assess the need to integrate the applicable commercial standards into its operational risk-management framework. In addition, an FMI should seek to comply with, or, depending on the FMI's importance and level of interconnectedness, exceed the relevant industry's best practices. In addition, an FMI's governance arrangements are pertinent to its operational risk-management framework and internal controls (see also principle 2 on governance).¹⁰⁸ In particular, an FMI's board should explicitly define responsibilities for operational risk and detail any acceptance of these risks.

3.17.5. An FMI's arrangements with participants, operational policies, and operational procedures should be periodically, and whenever necessary, tested and reviewed, especially after significant changes occur to the system or a major incident occurs. Tests should be carried out in a "testing environment" that whenever possible replicates the production environment (including the implemented security provisions of the production environment, in particular, regarding data confidentiality), in order to minimise any effects of the testing. Additionally, key elements of an FMI's operational risk-management policy should be audited periodically and whenever necessary. In addition to periodic internal audits, external audits may be necessary, depending on the FMI's importance and level of interconnectedness. Consistent with the evolving nature of operational risk management, an FMI's operational objectives also should be periodically reviewed to incorporate new technological and business developments.

3.17.6. As the proper performance of an FMI's employees is a core aspect of any operational risk-management framework, an FMI should employ sufficient and well-qualified personnel. An FMI's personnel must be able to operate the system safely and efficiently and consistently follow operational and risk-management procedures during normal and abnormal circumstances. An FMI should implement appropriate human resources policies to hire, train, and retain qualified personnel, to include policies that mitigate the effects of high rates of personnel turnover or key-person risk. Additionally, an FMI should have appropriate human resources and risk-management policies to address fraud prevention.

3.17.7. The FMI's operational risk-management framework should include formal change-management and project-management processes to minimise operational risk arising from modifications to operations, policies, procedures, and controls. Change-management

¹⁰⁸ Unsound governance arrangements that do not provide for accountability may lead to gaps in management that can increase operational risks.

processes should provide mechanisms for preparing, approving, tracking, testing, and implementing all changes to the system. Project-management processes, in the form of policies and procedures, should mitigate the risk of any inadvertent effects on an FMI's current or future activities due to a major project to upgrade, expand, or alter its service offerings in any way. In particular, these policies and procedures should guide the management, documentation, governance, communication, and testing of projects, regardless of whether projects are outsourced or executed in-house.

Operational reliability

3.17.8. An FMI should have clearly defined operational reliability objectives and should have policies in place that are commensurate with those objectives. These objectives serve as benchmarks for an FMI to evaluate its efficiency and effectiveness, promote confidence among an FMI's participants, and evaluate its performance against expectations. Operational reliability objectives should include the FMI's operational performance objectives and committed service-level targets.¹⁰⁹ Operational performance objectives and service-level targets should formally define both qualitative and quantitative measures of operational performance and explicitly state the performance standards the FMI is committed to meet. The FMI should monitor and assess regularly whether the system is meeting its established objectives and service-level targets. The system's performance should be reported regularly to senior management, relevant board committees, participants, and authorities. In addition, an FMI's operational objectives should be periodically reviewed to incorporate new technological and business developments.

Incident management

3.17.9. An FMI should have comprehensive and well-documented procedures in place to record, report, analyse, and resolve all operational incidents. After every significant disruption, an FMI and, when relevant, its participants should undertake a "post-mortem" review to identify the causes, and any required improvement to the normal operations or business continuity arrangements.

Operational capacity

3.17.10. An FMI should ensure that it has sufficient capacity and scalability to handle increasing or stress volumes and to achieve its service-level objectives, such as the required processing speed. A TR should also have sufficient capacity and scalability to maintain historical data as required. Capacity management requires that the FMI continuously monitor, review, and test (including stress test) the actual capacity and performance of the system. The FMI should carefully forecast demand and make appropriate plans to adapt to any change in the volume of business or technical requirements. These plans should be based on a sound, comprehensive methodology so that the required service levels and performance can be achieved and maintained. As part of its capacity planning, an FMI should determine a required level of redundant capacity, taking into account the FMI's level of importance and interconnectedness, so that if an operational outage occurs, the system is able to resume operations and process all remaining transactions before the end of the day.

Physical and information security

3.17.11. An FMI should have comprehensive policies regarding physical, environmental, and information security. In particular, an FMI should have well-defined policies to assess and

¹⁰⁹ These may include percentage of operating hours in which all processes are expected to be handled on time, maximum time in which back-up systems are to be up and running if needed, and other metrics related to operational performance.

mitigate vulnerabilities in its physical sites from attacks, intrusions, and natural disasters. An FMI also should have sound and robust information security policies, standards, practices, and controls to ensure an appropriate level of confidence and trust in the FMI by all stakeholders. These policies, standards, practices, and controls should include the identification, assessment, and management of security threats and vulnerabilities for the purpose of implementing appropriate safeguards into its systems. Data should be protected from loss and leakage, unauthorised access and other processing risks, such as negligence, fraud, poor administration, and inadequate recordkeeping. An FMI's information security objectives and policies should conform to commercially reasonable standards for confidentiality, integrity, authentication, authorisation, non-repudiability, availability, and auditability (or accountability).

Business continuity planning

3.17.12. An FMI's business continuity plan is another key component of an FMI's operational risk-management framework. Business continuity plans should have clearly stated objectives, policies, and procedures that allow for the rapid recovery and timely resumption of critical operations following a disruption to a service, including in the event of a wide-scale disruption. An FMI should explicitly assign responsibility for business continuity planning and devote adequate resources to this planning. The plan should identify and address events that can significantly disrupt operations, including extreme but plausible scenarios, and should focus on the impact on the operation of critical infrastructures and services. An FMI's business continuity plan should ensure that the FMI can continue to meet agreed-upon service levels in such events. Both internal and external threats should be considered in the business continuity plan, and the impact of each failure should be identified and assessed. In addition to reactive measures, an FMI's business continuity plan may need to include measures that prevent disruptions. All aspects of the business continuity plan should be clearly and fully documented.

3.17.13. The objectives of an FMI's business continuity plan should include the system's recovery time and recovery point. An FMI must set up a secondary site with sufficient resources, capabilities, functionalities, and staffing to allow the site to take over operations if needed. The secondary site should provide levels of services similar to those provided by the primary site and should be located at an appropriate geographical distance.¹¹⁰ An FMI should be able to resume operations within two hours following disruptive events; however, backup systems ideally should commence processing immediately. Settlement before the end of the day should be ensured even in extreme conditions. In such extreme conditions, an FMI may resume operations with some data loss; however, contingency plans should ensure that the status of all transactions at the time of the disruption can be identified with certainty in a timely manner. Depending on the FMI's importance and level of interconnectedness, the need and possibilities for a third site could be considered, in particular if the diversity of the risk profiles of the primary and secondary sites do not provide sufficient confidence that the FMI's business continuity objectives will be met in all scenarios. Furthermore, an FMI should consider alternative arrangements to allow for the processing of time-critical transactions in the extreme circumstance that none of the FMI's sites are operational.

3.17.14. An FMI's business continuity plan should also include clearly defined procedures for crisis and event management. The plan, for example, should address the need for rapid

¹¹⁰ An FMI should conduct a comparative risk analysis of secondary-site locations in order to have as distinct a risk profile as possible between sites. This means that the secondary site should in principle not be affected by an event that affects the primary site, with the exception of some very specific threats, such as a coordinated attack. Each site must have robust resilience based on the duplication of software and hardware, and the technology in place to replicate data between the various sites should be consistent with the chosen recovery-point objectives.

deployment of a multi-skilled crisis and event-management team, as well as procedures to consult and inform participants, interdependent FMIs, authorities, and others (such as service providers, and, where relevant, the media) quickly. Communication with regulators is critical in case of a major disruption to an FMI's operations or a wider market distress that affects the FMI, particularly where relevant authorities might rely on data held by the FMI for crisis management. Depending on the nature of the problem, communication channels with local civil authorities (for physical attacks or natural disasters) or computer experts (for software malfunctions or cyber attacks) may also need to be activated. If an FMI has global importance or critical linkages to one or several interdependent FMIs, it should set up, test, and review appropriate cross-system or cross-border crisis-management arrangements.

3.17.15. An FMI's business continuity plan and its associated arrangements should be subject to periodic review and testing. Tests should address various scenarios that simulate large-scale disasters and intersite switchovers. An FMI's employees, participants, and critical service providers should be thoroughly trained to execute the business continuity plan and should be regularly involved in the testing, and the FMI should also consider the need to participate in industry-wide tests. An FMI should make appropriate adjustments to its business continuity plans and associated arrangements based on the results of the testing exercises.

Interdependencies

3.17.16. Because an FMI is interconnected directly and indirectly to its participants, other FMIs, and its service and utility providers, the FMI should take a broad perspective and identify both direct and indirect effects on its own ability to process and settle transactions in the normal course of business and manage risks that stem from an external operational failure of interconnected entities. These effects include those transmitted through its participants, which may be involved in multiple FMIs. In addition, an FMI should also identify, monitor, and mitigate the risks it faces from and poses to other FMIs (see principle 20 on FMI links). An FMI also should consider the risks associated with its service and utility providers, and the operational effect on the FMI if their service providers fail to perform as expected. An FMI should be committed to providing reliable service, not only for the benefit of its direct participants, but also for all entities that would be affected by its ability to process transactions.

3.17.17. To manage the operational risks associated with its participants, an FMI should consider establishing minimum operational requirements for its participants (see also principle 18 on access and participation requirements). For example, an FMI may want to define operational and business continuity requirements for participants in accordance with the participant's role and importance to the system. An FMI may want to identify critical participants based on the consideration of transaction volumes and values, services provided to the FMI and other interdependent systems, and, more generally, the potential impact on other participants and the system as a whole in the event of a significant operational problem. Critical participants may need to meet some of the same operational risk-management requirements as the FMI itself. An FMI should have clear and transparent criteria, methodology, or standards for critical participants to ensure their operational risks are managed appropriately.

3.17.18. An FMI that relies upon or outsources some of its operations to another FMI or a third-party service provider (for example, data processing and information systems management) should ensure that those operations meet the same requirements they would need to meet if they were provided internally. The FMI should have robust arrangements for the selection and substitution of such providers, timely access to all necessary information, and the proper controls and monitoring tools. A contractual relationship should be in place between the FMI and the service provider allowing the FMI and relevant authorities to have full access to the necessary information. The contract should ensure that the FMI's approval is mandatory before the service provider can itself outsource material elements of the

service, and that in the event of such arrangements, full access to the necessary information is preserved. Clear lines of communication should be established between the outsourcing entity and the service provider to facilitate the flow of functions and information between parties in both ordinary and exceptional circumstances.

3.17.19. An FMI that outsources operations to third-party providers should disclose the nature and scope of this dependency to its participants. In addition to these service providers (such as financial messaging providers), an FMI is also typically dependent on the adequate functioning of utilities (such as power and telecommunication companies). As a result, an FMI should identify the risks from its service providers and utilities and take appropriate actions to manage these dependencies through appropriate contractual and organisational arrangements. An FMI should inform its relevant authorities about any such dependencies on critical service providers and utilities, and take measures to allow these authorities to be informed about the performance of these critical service providers and utilities. To that end, the FMI can contractually foresee direct contacts between the critical service provider and the authority, or contractually ensure that the authority can obtain specific reports from the critical service provider.

3.17.20. The relevant authority of the FMI may establish expectations specifically targeted at critical service providers, in particular the ones that may generate environmental interdependencies because several FMIs and some of their key participants rely upon their services, as presented in annex F. Adherence to these expectations can be achieved in one of two ways, at the discretion of the authority: (a) the authority monitors adherence to the expectations itself in a direct relationship with the critical service provider or (b) the authority communicates the standards to the FMI, which obtains assurances from its critical service providers that they comply with the expectations. These expectations may also be relevant to an FMI as it reviews its contracts with critical service providers.

Access

Access to an FMI is typically important because of the critical role many FMIs play in the markets they serve. In general, an FMI should establish appropriate access policies that promote fair and open access, while ensuring its own safety and efficiency. Access issues include those relating to direct access by participants and other FMIs, as well as access by indirect participants. The following principles provide guidance on access and participation requirements as well as the management of tiered participation arrangements and FMI links.

Principle 18: Access and participation requirements

An FMI should have objective, risk-based, and publicly disclosed criteria for participation, which permit fair and open access.

Key considerations

- 1. An FMI should allow for fair and open access to its services, including by direct and, where relevant, indirect participants and other FMIs, based on reasonable risk-related participation requirements.*
- 2. Any restrictions in an FMI's participation requirements should be justified in terms of the safety and efficiency to the FMI and the markets it serves, be tailored to its specific risks, and be publicly disclosed.*
- 3. An FMI should monitor compliance with its participation requirements on an ongoing basis, and have clear procedures for facilitating the suspension and orderly exit of a participant that breaches, or no longer meets, the participation requirements.*

Explanatory note

3.18.1. Access refers to the ability to use an FMI's services and includes the direct use of the FMI's services by participants, including other market infrastructures (for example, trading platforms) and service providers (for example, matching and portfolio compression service providers). In some cases, this includes the rules governing indirect participation. An FMI should permit fair and open access to its services. It should, however, control the risks to which it is exposed by its participants by setting objective risk-based requirements for participation in its services. An FMI should ensure that its participants and any linked FMIs have the requisite operational capacity, financial resources, legal powers, and risk-management expertise so that their activities do not generate unacceptable risk for the FMI and other participants. An FMI's participation requirements should be clearly stated and publicly disclosed, so as to eliminate ambiguity and promote transparency.

Fair and open access to payment systems, CSDs, SSSs, and CCPs

3.18.2. Fair and open access to FMI services encourages competition among market participants and promotes efficient and low-cost clearing and settlement. Because an FMI often benefits from economies of scale, there is typically only one or a small number for a particular market. As a result, participation in an FMI may have a significant influence on the competitive balance among market participants. In particular, limiting access to an FMI's services may disadvantage market participants (and their customers), other FMIs, and service providers that do not have access to the FMI's services. Further, access to one or more FMIs may play an important role in a marketwide plan or policy for the safe and efficient clearing of classes of financial instruments, and the promotion of efficient financial markets (including the reporting and recording of transaction data). An FMI's participation requirements should therefore encourage broad access, including access by participants, other market infrastructures, and where relevant service providers, in all relevant jurisdictions, based on reasonable risk-related participation requirements.

Fair and open access to TRs

3.18.3. For a TR, ensuring fair and open access is very important since there may be only one TR for a particular market and a wide set of stakeholders may need effective access to the TR's data warehousing services, both to store and retrieve data. Access is critical for participants storing trade information in the TR and for platforms that may submit transaction data on behalf of participants, including exchanges, electronic trading venues, and confirmation or matching service providers. In addition, other FMIs or platforms that offer ancillary services may need to obtain trade information from the TR to use as input.

3.18.4. In addition, a TR should provide terms of use that are commercially reasonable and aim to support interconnectivity with other FMIs and service providers, where requested, so that competition and innovation in post-trade processing are not impaired as a result of the centralising of recordkeeping activity. A TR should not engage in anti-competitive practices such as product or service tying, employing contracts with non-compete and exclusivity clauses, overly restrictive terms of use, or anti-competitive price discrimination. A TR should also not develop closed, proprietary interfaces that result in vendor lock-in or barriers to entry with respect to competing service providers that rely on the data maintained by the TR.

Risk-based participation requirements

3.18.5. An FMI, however, should always consider the risks that a participant may pose to the FMI and other participants. Accordingly, an FMI should establish adequate risk-based participation requirements to ensure that its participants meet appropriate financial requirements and have robust operations to allow them to perform their obligations to the FMI and other participants on a timely basis. Where participants act for other entities (indirect participants or users) it may be appropriate for the FMI to impose additional requirements to ensure that they have the capacity to do so. Operational requirements may include

reasonable criteria relating to the ability and readiness to use an FMI's services. Financial requirements may include reasonable risk-related capital requirements, the ability to contribute to prefunded default arrangements, and appropriate indicators of creditworthiness. Legal requirements may include appropriate licences and authorisations to conduct relevant activities, as well as legal opinions or other arrangements that ascertain that possible conflicts of laws issues would not impede participation of the applicant. An FMI also may require participants to have appropriate risk-management expertise. If an FMI admits non-regulated entities, it should take into account any additional risks that may arise from their participation and design its participation requirements, monitoring tools, and risk-management controls accordingly.

3.18.6. Participation requirements, including those applicable to indirect participants, should be justified in terms of safety and efficiency to the system and the broader financial markets.¹¹¹ The requirements should be objective and should not discriminate unduly against particular classes of participants or introduce competitive distortions. For example, participation requirements based solely on a participant's size are typically insufficiently related to risk and deserve careful scrutiny. Where necessary, an FMI can establish less restrictive participation requirements in conjunction with other appropriate risk-management controls. While restrictions on access should generally be based on reasonable risk-related criteria, such restrictions may also be subject to the constraints of relevant local laws and policies of the jurisdiction in which the FMI operates.¹¹² Requirements should also reflect the risk profile of the activity; an FMI may have different categories of participation based on the type of activity. For example, a participant in the clearing services of a CCP may be subject to a different set of requirements than a participant in the auctioning process of the same CCP.

3.18.7. To help address the balance between open access and risk, an FMI should manage its participant-related risks through the use of risk-management controls, risk-sharing arrangements, and other operational arrangements that have the least-restrictive impact on access and competition that circumstances permit. For example, an FMI can use credit limits or collateral requirements to help it manage its credit exposure to a particular participant. The effectiveness of such risk-management controls may mitigate the need for an FMI to impose onerous participation requirements that limit access. An FMI could also differentiate its services to provide different levels of access at varying levels of cost and complexity. For example, an FMI may want to limit direct participation to certain types of entities and provide indirect access to others.¹¹³ Participation requirements (and other risk controls) can be tailored to each tier of participants based on the risks each tier poses to the FMI and its participants.

Monitoring

3.18.8. An FMI should monitor compliance with its participation requirements on an ongoing basis, through the receipt of timely and accurate information. If a participant is an unregulated institution, an FMI should consider additional reporting requirements and

¹¹¹ Efficiency considerations may affect open access. For example, in some instances, factors such as minimum transaction volumes are also relevant to operational efficiency.

¹¹² For example, certain categories of financial institutions (such as non-deposit-taking institutions) may be excluded from an FMI, such as an LVPS, because of local banking laws or policies. Conversely, some local laws, such as securities and antitrust laws, may require broader inclusion of classes of participants.

¹¹³ For example, an FMI may accept direct receipt of settlement instructions from indirect participants, which settle on the books of a direct participant. Indirect participants may either be explicitly recognised in FMI rules and subject to risk controls or may be recognised and access the system through a direct participant. In all cases, an indirect participant has a bilateral agreement with a direct participant.

possibly other risk-management tools to manage any attendant risks. Participants should be obligated to report any developments that may affect their ability to comply with an FMI's participation requirements, and an FMI should have the authority to impose more-stringent restrictions or other risk controls on a participant in situations where it determines the participant poses heightened risk. For example, if a participant's creditworthiness falls below an FMI's minimum requirements, the FMI may require the participant to post additional collateral or reduce the participant's credit limit. The rules of an FMI should also provide for clearly defined and publicly disclosed procedures for facilitating the suspension and orderly exit of a participant that breaches, or no longer meets, the participation requirements of the FMI.

Principle 19: Tiered participation arrangements

An FMI should, to the extent practicable, identify, understand, and manage the risks to it arising from tiered participation arrangements.

Key considerations

- 1. An FMI should, to the extent practicable, identify, understand, and manage its potential risks arising from such tiered participation arrangements. The risks identified and the proposed mitigating actions should be reported to the FMI's board of directors.*
- 2. An FMI should ensure that its rules and procedures for direct participants allow it to gather basic information about indirect participation and to identify, monitor, and manage relevant concentrations of risk and important interdependencies. To the extent possible, an FMI should seek to identify direct participants acting on behalf of a material number of indirect participants, indirect participants with significant daily turnover in the system, indirect participants that are larger than the direct participants through which they access the FMI or that pose other specific risks.*
- 3. If an FMI identifies material risks arising from tiered participation arrangements, it should periodically review the system rules and procedures with its board to determine whether there are potential issues related to indirect participation in terms of legal structure, finality, or the stable operation of the system, and ensure that the nature of each user's participation is clearly defined.*

Explanatory note

3.19.1. From a broad perspective, since FMIs perform essential functions in financial markets, tiered participation arrangements may arise for using the FMI. For example, tiered arrangements can occur when participants in an FMI provide services to their customers using an FMI's central facilities. These customers, in turn, may provide services to their customers using the FMI's services, and so on.¹¹⁴ These tiered organisational structures, along with the dependencies they create, can present risks to an FMI as well as the broader financial markets. This principle encourages FMIs to identify, understand, and manage their risks arising from tiered participation arrangements, recognising that the ability of a particular FMI to identify, understand, and manage all such risks is likely to be limited.

3.19.2. For the purposes of this principle, an FMI can have two types of relationships that affect tiered participation arrangements. The first type of relationship is with participants in the FMI that are bound by the FMI's rules and agreements. Such participants and the management of the risks they present should be fully covered by the rules and agreements

¹¹⁴ In some cases, tiered arrangements may involve a complex series of financial intermediaries or agents.

of the FMI and are generally dealt with in other principles in this report.¹¹⁵ The second type of relationship is with entities that are not bound by the rules of the FMI, but whose transactions are recorded, cleared, or settled by or through the FMI.¹¹⁶ These entities are defined as “indirect participants” in the FMI for the purposes of this principle. Such indirect participants can be significantly removed from the FMI and its (direct) participants. As a consequence, an FMI may face legal or practical constraints in identifying or managing the risks that indirect participants present to the FMI. Despite these possible constraints, an FMI needs to integrate the treatment of these risks into its comprehensive framework for managing risks.

3.19.3. An FMI should, to the extent practicable, identify, understand, and manage its potential risks arising from indirect participants. In particular, an FMI should understand any risks presented by indirect participants that access the FMI as customers of (direct) participants. Because of the volumes of activity involved or the structure of financial markets, such customers may present significant risks to the FMI in tiered arrangements beyond those presented by (direct) participants. However, risks in tiered arrangements may depend on a variety of factors, including the type of FMI and market, the number of FMIs serving a market, the concentration of activity in a market, the type of risk, and most importantly, the access criteria of an FMI.

3.19.4. There are limits to the extent to which an FMI can in practice influence direct participants’ commercial relationships with their customers. However, FMIs are able to set direct participation requirements which may include criteria relating to how direct participants manage relationships with their customers, in so far as directly relevant for the safe and efficient operation of the FMI. At a minimum, an FMI should identify the types of risk which could arise from indirect participation, and to the extent possible it should seek to identify specific material risks. For example, a systemically important financial institution may have significant daily turnover in an FMI as a customer of a direct participant and could represent an unidentified potential material risk to the FMI.

Managing credit and liquidity risks of indirect participants

3.19.5. The management of credit and liquidity risks between direct and indirect participants is primarily the responsibility of those participants, and, where appropriate, their regulators. Nevertheless, an FMI needs to be aware of particular relationships that could significantly affect its risk profile. An FMI should ensure that its rules, agreements, and procedures with direct participants allow it to gather basic information about indirect participants and to identify, monitor, and manage relevant concentrations of risk and important interdependencies.¹¹⁷ This information should include, at a minimum, the proportion of payment, clearing, and settlement activity that is conducted by direct participants on behalf of indirect participants. To the extent possible, an FMI should seek to identify direct participants acting on behalf of a material number of indirect participants, indirect participants with significant daily turnover in the system, indirect participants that are larger than the direct participants through which they access the FMI or that pose other specific risks. An FMI should regularly review, with its board of directors, potential risks arising from indirect participation.

¹¹⁵ Some FMIs may label certain classes of participants bound by the FMI’s rules as “indirect participants,” but this convention is not adopted in this principle.

¹¹⁶ In some cases, indirect participants may be defined or identified in an FMI’s rules, but are not bound directly by those rules.

¹¹⁷ An FMI may be able to obtain this information through its internal systems or by requesting it from direct participants.

Indirect participant-default procedures

3.19.6. Poor management of the default of an indirect participant could in some circumstances generate disruptions within the FMI and the broader financial markets. To the extent practicable, an FMI should ensure that its default and loss-sharing arrangements can manage the transaction flows that might be generated by such a default, recognising that the visible net flows of a direct participant could disguise imbalances between the regular flows of the direct participant and its associated indirect participants. If an FMI identifies direct participants acting on behalf of large indirect participants, the FMI should also ensure it has adequate information to understand such direct participants' processes and procedures (such as rescinding future dated transactions) for managing an indirect participant default and whether such processes and procedures can be scaled up to deal with the default of a large indirect participant, without exposing the FMI to operational and reputational risks.

3.19.7. The default of an indirect participant could also raise legal and operational uncertainty for the FMI. For example, there may be uncertainty about whether the indirect participant remains principal to an underlying deal. The status of transactions that are at various points of their life cycle may also be unclear when an indirect participant defaults. An FMI should therefore review its rules and procedures to ensure there is clarity about the nature of participation of direct and indirect participants and, to the extent practicable, ensure there are no additional legal, contractual, or finality issues resulting from indirect participation. The outcome of reviewing these issues should be reported to and agreed to by the board of directors. The review should be updated periodically and after substantial amendments to an FMI's rules.

Limiting indirect participation

3.19.8. There are limits to the extent to which an FMI can in practice implement controls affecting direct participants' relationships with their customers. When considering implementing any such controls, an FMI should consider carefully the potential adverse consequences. If certain types or sizes of institutions were to be denied access to the system as a result, there is a risk that transactions would be settled in alternative systems or by other means, which could give rise to greater risks to the participants concerned and potentially to the financial system as a whole. Overall, there is a presumption that an FMI's rules should promote fair and open access, for both direct and indirect participants (see principle 18 on access and participation requirements).

Principle 20: FMI links

An FMI that establishes a link with one or more FMIs should identify, monitor, and manage link-related risks.

Key considerations

1. *Before entering into a link arrangement and on an ongoing basis once the link is established, an FMI should identify and assess all potential sources of risk arising from the link arrangement. Link arrangements should be designed such that each FMI is able to observe the other principles in this report.*
2. *A link should have a well-founded legal basis, in the relevant jurisdictions, that supports its design and provides adequate protection to the FMIs in the operation of the link.*
3. *Linked CSDs should measure, monitor, and manage their credit and liquidity risks arising from each other. Any credit extensions between CSDs should be covered fully with high-quality collateral and be subject to limits.*

4. *Provisional transfers of securities between linked CSDs should be prohibited or, at a minimum, the retransfer of provisional transferred securities should be prohibited prior to the transfer becoming final.*
5. *An investor CSD should only establish a link with an issuer CSD if the arrangement provides a high level of protection for the rights of the investor CSD's participants.*
6. *An investor CSD that uses an intermediary to operate a link with an issuer CSD should measure, monitor, and manage the additional risks (including custody, credit, and operational risks) arising from the use of an intermediary.*
7. *Before entering into a link with another CCP, a CCP should identify the potential spillover effects of the linked CCP's default and assess its ability to cope with such occurrence. If a link has three or more CCPs, each CCP should identify, assess, and manage the risks of the collective links arrangement.*
8. *The inter-CCP risk management for the provision and holding of financial resources should enable each CCP to cover at least on a daily basis its current exposures fully and its potential future exposure with a high degree of confidence, without reducing the CCP's ability to fulfil its own obligations at any time.*
9. *A TR should carefully assess the additional operational risks related to its links to ensure the scalability and reliability of IT and related resources.*

Explanatory note

3.20.1. An FMI may establish links with other FMIs. A link is a set of contractual and operational arrangements between two or more FMIs that connect the FMIs directly or through an intermediary. An FMI may establish a link with a similar type of FMI for the primary purpose of expanding its services to additional financial instruments, markets, or institutions.¹¹⁸ For example, a CSD (referred to as an investor CSD) may establish a link to another CSD (referred to as an issuer CSD in which securities are issued or immobilised) to enable a participant in the investor CSD to access the services of the issuer CSD through the participant's existing relationship with the investor CSD. A CCP may establish a link with another CCP to enable a participant in the first CCP to clear trades with a participant in the second CCP through the participant's existing relationship with the first CCP. If an FMI establishes a link, it should identify, assess, and manage its links-related risks, including legal, operational, credit, and liquidity risks. Further, an FMI that establishes multiple links should ensure that the risks generated in one link do not spillover and affect the soundness of the other links and FMIs. Mitigation of such spill-over effects may require the use of strong risk-management controls, including additional financial resources, or the harmonisation of risk-management frameworks across FMIs.

Identifying link-related risks

3.20.2. Before establishing a link and on an on-going basis once a link is established, an FMI should identify and assess the potential sources of risks that can arise from any link arrangement with another FMI. The type and degree of risk varies according to the design and complexity of the FMIs and the nature of the relationship between them. In the most-straightforward type of link, an FMI provides basic settlement services to another FMI (for

¹¹⁸ An FMI may also establish links with other FMIs along the payment, clearing, and settlement chain, such as a CSD link to a payment system, a CCP link to a payment system, or CCP link to a CSD, to conduct settlements. These types of link arrangements are addressed in principle 9 on money settlements and principle 16 on custody and investment risks. TRs may also establish links with other FMIs along the value chain such as payment systems and CCPs.

example, one CSD providing securities transfer services to another CSD). Such links typically pose only operational and custody risks. Other links (for example, one CCP providing clearing services to another CCP) may be more complex and may pose additional risks to FMIs, such as credit and liquidity risks.¹¹⁹ Cross-margining by two or more CCPs also raises similar link-related issues because the CCPs may rely on each other's risk-management systems to measure, monitor, and manage credit and liquidity risks. Link arrangements should be designed such that each FMI is able to observe the other principles in this report.

Managing legal risks

3.20.3. A link should have a well-founded legal basis in the relevant jurisdictions that supports its design and provides adequate protection to the FMIs in the operation of the link. Links may present legal risk arising from differences between the laws and contractual rules governing the linked FMIs and their participants, including those relating to rights and interests, collateral arrangements, settlement finality, and netting arrangements.¹²⁰ For example, differences in law and rules concerning settlement finality may lead to a scenario where a transfer is regarded as final in one FMI but not final in the linked FMI. In some jurisdictions differences in laws may create uncertainties regarding the enforceability of CCP obligations assumed by novation, open offer, or other similar legal device. Differences in insolvency laws may unintentionally give the participant in one CCP a claim on the assets or other resources of the linked CCP in the event of the first CCP's default. To limit these uncertainties, the respective rights and obligations of the linked FMIs and, where necessary, their participants should be clearly defined in the links agreement. The terms of the links agreement should also set out, in cross-jurisdictional contexts, an unambiguous choice of law that will govern each aspect of the link.

Managing operational risk

3.20.4. An FMI should assess and monitor the operational reliability of any link it intends to establish with another FMI. To this end, linked FMIs should provide an appropriate level of information to each other in order for each FMI to perform a robust and periodic assessment of the operational risk associated with the link. In particular, FMIs should ensure that the risk-management arrangements and processing capacity are sufficiently scalable and reliable to operate the link for both the current and projected peak volumes of activity processed over the link (see principle 17 on operational risk). Systems and communication arrangements between the FMIs also should be reliable and secure so that the operation of the link does not pose significant operational risk to the linked FMIs. Any reliance by a linked FMI on a critical service provider should be disclosed as appropriate to the other FMI. In addition, a linked FMI should consider operational risks due to complexities or inefficiencies associated with differences in time zones, particularly as these affect staff availability. Governance arrangements should ensure that change management in one FMI will not inhibit the smooth functioning of the link, the related risk-management arrangements, or non-discriminatory access to the link.¹²¹

¹¹⁹ A link between two or more CCPs may enable participants in a CCP in one market to clear transactions in another market through their existing arrangements. By broadening trading opportunities for market participants, without imposing all of the costs normally associated with establishing clearing relationships, links can deepen the liquidity in markets. A link may also reduce the costs of systems development and operation faced by CCPs because it enables them to share these expenses.

¹²⁰ See also principle 1 on legal basis.

¹²¹ See also principle 2 on governance and principle 18 on access and participation requirements.

Managing financial risk

3.20.5. FMIs in a link arrangement should closely monitor and effectively measure, monitor, and manage their financial risk, including custody risk, arising from the link arrangement. FMIs should ensure that they and their participants have adequate protection of assets in the event of an insolvency of a linked FMI or a participant default in a linked FMI. Specific guidance on mitigating and managing these risks in CSD-CSD links and CCP-CCP links are provided below.

CSD-CSD links

3.20.6. As part of its activities, an investor CSD may choose to establish a link with another CSD. If such a link is improperly designed, the settlement of transactions across the link could subject participants to new or increased risks. In addition to legal and operational risks, linked CSDs and their participants could also face credit and liquidity risks. For example, an operational failure or default in one CSD may cause settlement failures or defaults in a linked CSD and expose participants in the linked CSD, including participants that did not settle transactions across the link, to face unexpected liquidity pressures or outright losses. A CSD's default procedures, for example, could affect a linked CSD through loss-sharing arrangements. Linked CSDs should measure, monitor, and manage their credit and liquidity risks with each other. In addition, any credit extensions between CSDs should be covered fully by high-quality collateral and be subject to limits.¹²² Furthermore, some practices deserve particularly rigorous attention and controls. In particular, provisional transfers of securities between linked CSDs should be prohibited or, at a minimum, the retransfer of provisional transferred securities should be prohibited prior to the transfer becoming final.

3.20.7. An investor CSD should only establish links with an issuer CSD if the link arrangement provides a high level of protection for the rights of the investor CSD's customers. In particular, the investor CSD should use issuer CSDs that provide adequate segregation and portability of securities in the event that the issuer CSD becomes insolvent (see principle 11 on CSDs). In some cases, securities held by an investor CSD can be subject to attachment by the creditors of the CSD or its participants and, as such, can also be subject to freezing or blocking instructions from local courts or regulators. Further, if an investor CSD maintains securities in an omnibus account at an issuer CSD and a participant fails at the investor CSD, the investor CSD should not use the securities belonging to other participants to settle (the same day) subsequent local deliveries of the defaulting participant. The investor CSD should have adequate measures and procedures to avoid effects on the use of securities belonging to non-defaulting participants in a participant-default scenario.

3.20.8. Furthermore, linked CSDs should have robust reconciliation procedures to ensure that their respective records are accurate and current. Reconciliation is a procedure to verify that the records held by the linked CSDs match for transactions processed across the link. This process is particularly important when three or more CSDs are involved in settling transactions (that is, the securities are held in safekeeping by one CSD or custodian while the seller and the buyer participate in one or more CSDs) (see also principle 11 on CSDs).

Indirect CSD-CSD links

3.20.9. If an investor CSD uses an intermediary to operate a link with an issuer CSD, the investor CSD should measure, monitor, and manage the additional risks (including custody, credit, and operational risks) arising from the use of an intermediary. In an indirect CSD-to-CSD link, an investor CSD uses an intermediary (such as a custodian bank) to access the

¹²² In exceptional cases, other adequate collateral may be used to secure credit extensions between CSDs subject to the review and assessment by the relevant authorities.

issuer CSD. In such cases, the investor CSD faces the risk that the custodian bank may become insolvent, act negligently, or commit fraud. Even if there is no loss of the value of the securities, the ability of the investor CSD to use its securities might temporarily be impaired. The investor CSD should measure, monitor, and manage on an ongoing basis its custody risk (see also principle 16 on custody and investment risk) and provide evidence to the relevant authorities that adequate measures have been adopted to limit and monitor this custody risk. In addition, the investor CSD should ensure that it has adequate legal, contractual, and operational protection to ensure that its assets held in custody are segregated and portable. Similarly, an investor CSD should ensure that its settlement banks or cash correspondents can perform as expected. In that context, the investor CSD should have an adequate level of information on the business continuity plans of its intermediary, as well as those of the issuer CSD.

CCP-CCP links

3.20.10. A CCP may establish links with one or more other CCPs. To date, two basic types of CCP links can be distinguished among possible CCP link arrangements: peer-to-peer links and participant links. Details of link arrangements among CCPs differ significantly because of the varied designs of CCPs and the markets they serve. In a peer-to-peer link, CCPs typically interoperate on an equal basis. Risk management between the CCPs is based on a bilaterally approved framework, which is different than that applied to a normal participant. In a participant link, a CCP maintains a link with another CCP in a manner similar to that of a direct participant, although potentially with some customisation of its access or other requirements. Either type of link may present new or increased risks that should be identified, assessed, mitigated and managed by the CCP.

3.20.11. The most challenging issue with CCP links is the risk management of the financial exposures that potentially arise from the link arrangement. Before entering into a link with another CCP, a CCP should identify and assess the potential spillover effects if a linked CCP were to default. If a link has three or more CCPs, each CCP should identify and assess the risks of the collective link arrangement. Thus, a network of links between CCPs that does not properly acknowledge and address the inherent complexity of multi-CCP links, could have significant implications for systemic risk. Exposures faced by one CCP from its linked CCP should be monitored and managed to the same confidence level as exposures from a CCP's participants, primarily through the use of margin or other equivalent financial resources. In particular the inter-CCP risk management for the provision and holding of financial resources should enable each CCP to cover its current exposures fully and its potential future exposures with a high degree of confidence, without reducing the CCP's ability to fulfil its own obligations at any time.¹²³ If a CCP provides initial margin to another CCP under a link, that margin should be at least equal to that which would be given for the same position by a participant that is not a CCP.

3.20.12. Linked CCPs should also take into account the effects that contributions to each others' prefunded default arrangements, exchange of margins (to the extent possible), common participants, major differences in their risk-management tools, and other relevant specific features may have on their risk-management framework, especially in relation to the credit, liquidity, and operational risks they face. Due to the different possible types of link arrangements, different combinations of risk-management measures may be used by the CCP, provided they give an equivalent level of risk mitigation. Financial resources covering inter-CCP current exposures should be pre-funded with highly liquid assets that exhibit low credit risk. Best practice is for CCPs to have near real-time inter-CCP risk management. However, at a minimum, linked CCP financial exposures should be managed on a daily

¹²³ See principle 6 on margins.

basis. CCPs also need to consider and address the risks arising from links in designing their stress tests and calibrating their prefunded default arrangements.

3.20.13. A CCP may have to post margin with another linked CCP for open positions. In some cases, the CCP may not be able to post margin that it has collected from its participants to the linked CCP because the first CCP's rules may prohibit the use of its participants' margin for any purpose other than to cover losses from a participant default. As such, the CCP would need to use alternative financial resources to meet the margin requirements of the linked CCP. If the first CCP is allowed to reuse its participants' margin, the linked CCP could still face potential liquidity risk if the amount of collected margin is insufficient to meet the margin requirements or liquidity needs of the linked CCP.¹²⁴ Another source of risk may emerge if a link arrangement treats the linked CCP differently from other participants, such as setting less strenuous participation requirements for the linked CCP than for other participants.

3.20.14. CCPs also face other risks from their link arrangements. For example, one CCP may be exposed to loss mutualisation from defaults of a linked CCP's participants, notwithstanding the fact that the first CCP is unable to monitor or control directly the other CCP's participants. Such contagion risks can be even more serious in cases where more than two CCPs are linked in an arrangement. Further, as a result of confidentiality restrictions, each CCP may only know how risks are managed between itself and the CCPs to which it is directly linked, but not how risks are managed between other CCPs in a series of bilateral links or an overall multi-link arrangement. Typically, CCPs should not contribute to each other's default fund. Further they should maintain risk-management arrangements which may involve a separate default fund to cover risk from a link.

3.20.15. In a peer-to-peer link, a CCP maintains special arrangements with the other CCP and is not subject to normal participant rules. Typically, however, the CCPs exchange margin and other financial resources on a reciprocal basis. The linked CCPs face current and potential future exposures to each other as a result of the process whereby they each net the trades cleared between their participants so as to create novated (net) positions between the CCPs. In case a participant is a member in all of the linked CCPs, linked CCPs could collateralise their "net" open positions at each of the linked CCPs.¹²⁵ In most cases, this would not enable the participant to have complete netting or cross-margining over its overall position since each CCP will require their positions to be covered fully.

3.20.16. In a participant link, one CCP is just a participant in the other CCP and is subject to all the CCP's rules in the same way as all the other participants. In such cases, the CCP that maintains an account for another CCP would typically require the other CCP to provide margin, as would be the case for a participant that is not a CCP. A participant linked CCP should mitigate and manage its risk from these links (that is a participant in another CCP) separately from the risks in its core clearing and settlement activities. For example, in the default of a CCP, a participant linked CCP may not have adequate protection, such as collateral and could face losses. The CCP that provides an account to another linked CCP may therefore need to hold additional financial resources to protect itself against the default of the linked CCP.

3.20.17. When linked CCPs have materially different risk-management frameworks, the risks stemming from a link are more complex. In such a case, the linked CCPs should carefully assess the effectiveness of their risk-management models and methodologies in

¹²⁴ The size of the exposure therefore depends on the differences between the risk-management frameworks of the two CCPs.

¹²⁵ However, typically one of the motivations for CCP links is to enable clearing members to join only one CCP per product rather than having to join multiple CCPs clearing the same product.

order to determine whether and to what extent their risk-management frameworks should be harmonised or whether additional risk-mitigation measures would be sufficient to mitigate risks stemming from the interoperability framework. If three or more CCPs are interlinked, the desirability of risk-management issues being addressed using a common risk-management framework is even greater.

Special considerations for TR links

3.20.18. A TR should carefully assess the additional operational risks related to its links to ensure the scalability and reliability of IT and related resources. A TR can establish links with another TR or with another type of FMI such as a CCP. Such links may expose the linked FMIs to additional risks if not properly designed. Besides legal risks, a link to either another TR or to another type of FMI may involve the potential spillover of operational risks. The mitigation of operational risk is particularly important because the information maintained by a TR can support bilateral netting and be used to provide services directly to market participants or other providers (for example, portfolio compression), including other linked FMIs. FMIs establishing a link to a TR should ensure that the system and communication arrangements between the linked entities are reliable and secure such that the operation of the link does not pose significant reliability and security risks. Moreover, given the role that a TR may play at the beginning of the clearing and settlement process for derivatives transactions, a TR should have governance arrangements that ensure the management of the linked entities would not inhibit the smooth functioning of the link, related risk-management arrangements, and non-discriminatory access to the link.¹²⁶ Therefore, the scalability of IT and related resources may be especially important.

Efficiency

An FMI should be both safe and efficient in performing its recording, payment, clearing, and settlement functions. The following set of principles provides guidance to FMIs on efficiency and effectiveness, along with one traditional aspect of efficiency contained in previous reports – communication procedures and standards.

Principle 21: Efficiency and effectiveness

An FMI should be efficient and effective in meeting the requirements of its participants and the markets it serves.

Key considerations

- 1. An FMI should be designed to meet the needs of its participants and the markets it serves, in particular, with regard to choice of a clearing and settlement scheme; operating structure; scope of products recorded, cleared, or settled; and use of technology and procedures.*
- 2. An FMI should have clearly defined goals and objectives that are measurable and achievable, such as in the areas of minimum service levels, risk-management expectations, and business priorities.*
- 3. An FMI should have established mechanisms for the regular review of its efficiency and effectiveness.*

¹²⁶ See principle 18 on access and participation requirements.

Explanatory note

3.21.1. An FMI should be efficient and effective in meeting the needs of its participants and the markets it serves, while also maintaining appropriate standards of safety and security as outlined in the principles in this report.¹²⁷ “Efficiency” refers generally to the resources required by the FMI to perform its functions, while “effectiveness” refers to whether the FMI is meeting its intended goals and objectives. An FMI that operates inefficiently or functions ineffectively may distort financial activity and the market structure, increasing not only the financial and other risks of an FMI’s participants, but also the risks of their customers and end users. If an FMI is inefficient, a participant may choose to use an alternate arrangement that poses increased risks to the financial system and the broader economy. The primary responsibility for promoting the efficiency and effectiveness of an FMI belongs to its owners and operators.

Efficiency

3.21.2. An FMI should be efficient. Efficiency is a broad concept that encompasses what an FMI chooses to do, how it does it, and the resources required. An FMI’s efficiency depends partly on its choice of a clearing and settlement scheme (for example, gross, net, or hybrid settlement, real-time or batch processing, and novation or guarantee scheme); operating structure (for example, links with multiple trading venues or service providers); scope of products recorded, cleared, or settled; and use of technology and procedures (for example, communication links and straight-through-processing (STP) protocols). In designing an efficient system, an FMI should also take into consideration the practicality and costs for participants, their customers, and other relevant parties (including other FMIs and service providers).¹²⁸ Furthermore, the FMI’s technical arrangements should be sufficiently flexible to respond to changing demand and new technologies. Fundamentally, an FMI should be designed and operated to meet the needs of its participants and the markets it serves. An FMI’s efficiency will ultimately affect the use of the FMI by its participants and their customers, as well as the broader efficiency of financial markets.

3.21.3. Efficiency also involves cost control. In this context, an FMI is efficient when it understands its direct and indirect costs. An FMI should control its direct costs, for example, those stemming from transaction processing, money settlement, and settlement-entry preparation and execution. An FMI also should consider and control its indirect costs. Typically these are infrastructure, administrative, and other types of indirect costs associated with operating the FMI. Some indirect costs (and risks) may be less apparent. For example, an FMI may need to consider its participants’ liquidity costs, which include the amount of cash or other financial instruments a participant must hold with the FMI or other parties in order to process its transactions and the opportunity cost of holding such assets. The design of an FMI has a significant impact on the liquidity costs borne by participants, which, in turn, affect the costs and risk of the FMI. An FMI should have established mechanisms for the regular review of its efficiency, including its costs and pricing structure.¹²⁹

¹²⁷ There may be different ways for an FMI to meet a particular principle, but the objective of a particular principle should not be compromised.

¹²⁸ For a system to be practical for users, it needs to take into account the structure of the local market and its history and conventions. The system also must reflect the current and prospective costs of the inputs used, as well as evolving technologies. The type of system that appropriately meets the needs of its users will often require an understanding of local practices and technologies.

¹²⁹ A review of an FMI’s efficiency or cost-effectiveness could include an evaluation of both the productivity of operational processes and the relative benefits of the processing method given the corresponding costs. For example, an efficiency review could include analysing the number of transactions that could be processed in a given period or by measuring the processing cost per transaction.

Effectiveness

3.21.4. An FMI is effective when it reliably meets its obligations in a timely manner and achieves the public policy goals of safety and efficiency for participants and the markets it serves. In the context of oversight and auditing, an FMI's effectiveness may also involve meeting service and security requirements. To facilitate assessments of effectiveness, an FMI should have clearly defined goals and objectives that are measurable and achievable. For example, an FMI should set minimum service-level targets (such as the time it takes to process a transaction), risk-management expectations (such as the level of financial resources it should hold), and business priorities (such as the development of new services). An FMI should have established mechanisms for the regular review of its effectiveness, such as periodic measurement of its progress against its goals and objectives.

3.21.5. For a TR to be effective, its goals and objectives should include timeliness and accuracy. A TR should promptly record the transaction information it receives from its participants. To ensure the accuracy and currency of data, a TR should employ timely and efficient recordkeeping procedures to document changes to recorded transaction information resulting from subsequent post-trade events. Ideally, a TR should set a service-level target to record to its central registry transaction information it receives from participants in real-time, and at a minimum, within one business day. A TR should have adequate procedures and timelines for making data available for any downstream processing and should implement quality controls to ensure the accuracy, validity, and integrity of the data it stores and disseminates. In addition, a TR should have effective processes and procedures for the provision of data to relevant authorities (see also principle 24 on disclosure of market data).

Principle 22: Communications procedures and standards

An FMI should use or accommodate the relevant internationally accepted communication procedures and standards in order to facilitate efficient recording, payment, clearing, and settlement across systems.

Key considerations

1. *An FMI should use, or at a minimum accommodate the use of, internationally accepted communication procedures that can support interoperability between the FMI, its participants, their customers, and other users (such as third-party service providers and other FMIs).*
2. *An FMI should use, or at a minimum accommodate, internationally accepted communication standards, such as standardised messaging formats and reference data standards for identifying financial instruments and counterparties.*
3. *An FMI that operates across borders should use, or at a minimum accommodate, internationally accepted communication procedures and standards.*

Explanatory note

3.22.1. The ability of participants to communicate in a quick, reliable, and accurate manner is key to achieving efficient recording, payment, clearing, and settlement. The adoption of internationally accepted communication procedures and standards contributes to the elimination of manual intervention in clearing and settlement processing, reduces risks and transaction costs, improves efficiency, and reduces barriers to entry into a market. Therefore, an FMI should use or accommodate relevant internationally accepted communication procedures and standards to ensure the most reliable, efficient, and accurate communication between the FMI, its participants, their customers, and other users. In particular, an FMI should be able to support and use consistent communication protocols, messaging standards, and reference data standards relating to counterparty identification and

numbering processes. For example, relevant standards promulgated by the International Organization for Standardization should be carefully considered and adopted by an FMI.

Communication procedures

3.22.2. An FMI should use, or at a minimum accommodate the use of, internationally accepted communication procedures that can support interoperability between the FMI, its participants, their customers, and other users (such as third-party service providers and other FMIs). Standardised communication procedures (or protocols) provide a common set of rules across systems for exchanging messages. These rules allow for interoperability and interconnectivity among technical systems, which enables more than one such system to be involved in the processing of a transaction without the need for manual intervention. Interoperability among systems also allows market participants to access multiple systems without facing technical hurdles, such as having to implement or support multiple local networks with different characteristics. Reductions in the need for intervention and technical complexity when processing transactions can help to reduce the number of errors, avoid information losses, and ultimately reduce the resources needed for data processing by the FMI, its participants, and markets generally. Such reductions can also help reduce barriers to access to relevant FMIs.

Communication standards

3.22.3. An FMI should adopt or, at a minimum, accommodate internationally accepted communication standards, such as standardised messaging formats and reference data standards for identifying financial instruments and counterparties.¹³⁰ The use of internationally accepted standards for message formats and data representation will generally improve the quality and efficiency of clearing and settlement. Also, their use is an important precondition for interoperability and for the introduction of STP enabling different systems to process information with little or no intervention or translation.¹³¹ If the FMI itself does not use internationally accepted communication standards, it should typically accommodate systems that translate or convert data from international standards into domestic ones and vice versa.

3.22.4. Communication standards are particularly important for a TR which may serve as a central data source for a variety of stakeholders. A TR should support technologies widely accepted in the market, including applicable market standards for recording and reporting trade information. A TR also should apply consistent industry standards for data representation, application interfaces, and communication links to enable technical interconnectivity with other FMIs and service providers. A TR should be able to exchange trade information not only directly with market participants but also with other entities such as exchanges, electronic trading venues, confirmation-matching platforms, CCPs, and other service providers.

Cross-border FMIs

3.22.5. An FMI that operates across borders should use, or at a minimum accommodate, internationally accepted communication procedures and standards to achieve efficient and effective cross-border communication. If an FMI does not fully adopt the international

¹³⁰ An FMI may not wish to use internationally accepted communication standards for purely domestic transactions.

¹³¹ STP is the automation of processing that allows data to be entered into technical systems only once and then used for all subsequent transaction processes.

procedures and standards, it can still achieve interoperability and interconnectivity with other FMIs by allowing for convertibility or translation of data using various standards.

Transparency

Transparency helps ensure that relevant information is provided to an FMI's participants, authorities, and the public to inform sound decision making and foster confidence. Generally, financial markets operate most efficiently when participants have access to relevant information concerning the risks to which they are exposed. FMIs may play an important role in facilitating greater transparency. In particular, TRs are designed to help improve the overall transparency of the OTC derivatives markets and potentially other markets. The following set of principles are designed to provide guidance to (a) all FMIs on the disclosure of rules, procedures, data, and other information to enable participants and other interested parties to have a clear understanding of the risks and controls on risks associated with an FMI and (b) TRs on the disclosure of market data to allow participants, authorities, and the public to make timely assessments of the OTC derivatives markets and any other markets served by the TR.

Principle 23: Disclosure of rules and key procedures

An FMI should have clear and comprehensive rules and procedures and should provide sufficient information to enable participants to have an accurate understanding of the risks they incur by participating in the FMI. All relevant rules and key procedures should be publicly disclosed.

Key considerations

- 1. An FMI should adopt clear and comprehensive rules and procedures that are fully disclosed to participants and relevant rules and key procedures should be publicly disclosed.*
- 2. An FMI should disclose clear descriptions of the system's design and operations, as well as the rights, obligations, and risks participants incur by participating in the FMI.*
- 3. An FMI should provide all necessary and appropriate documentation and training to facilitate participants' understanding of the FMI's rules and procedures and the risks they face from participating in the FMI.*
- 4. An FMI should publicly disclose its fees at the level of individual services it offers, as well as its policies on any available discounts. The FMI should provide clear descriptions of priced services for comparability purposes.*

Explanatory note

3.23.1. An FMI should provide sufficient information to its participants and prospective participants to enable them to identify clearly and understand fully the risks and responsibilities of participating in the system. To achieve this objective, an FMI should adopt and disclose written rules and procedures that are clear and comprehensive and that include explanatory material written in plain language so that participants fully understand the system's design and operations, their rights and obligations, and the risks of from participating in the system. An FMI's rules, procedures, and explanatory material need to be accurate, up-to-date, and readily available to all current and prospective participants. In addition, it is important to disclose to participants, as well as to the public, other information, such as fee schedules and discounts, plain language summaries of services, basic operational information, and answers to key questions that will be published in the final

report, in order to help promote a better understanding of the FMI's operations and its impact on participants and markets.

Rules and procedures

3.23.2. An FMI should adopt clear and comprehensive rules and procedures that are fully disclosed to participants and relevant rules and key procedures should be publicly disclosed. An FMI's rules and procedures are typically the foundation of the FMI and provide the basis for participants' understanding of the risks they incur by participating in the FMI. As such, these rules and procedures should include clear descriptions of the system's design and operations, as well as the rights, obligations, and risks participants incur by participating in the FMI. They should clearly outline the respective roles of participants and the FMI, as well as the procedures that will be followed in routine and non-routine circumstances. In particular, an FMI should have clear and comprehensive rules and procedures for addressing financial and operational problems within the system. An FMI should publicly disclose all relevant rules and key procedures, including key aspects of its participant-default rules and procedures (principle 13), so that all market participants and relevant authorities can quickly assess potential risks in periods of market stress.¹³²

3.23.3. In addition to disclosing all relevant rules and key procedures, an FMI should have a clear and fully disclosed process for proposing and implementing changes to its rules and procedures and informing participants and relevant authorities of these changes. Similarly, the rules and procedures should clearly disclose the degree of discretion that an FMI can exercise over key decisions that directly affect the operation of the system (see also principle 1 on legal basis and principle 2 on governance). For example, an FMI's procedures may provide for discretion regarding the extension of operating hours to accommodate unforeseen market or operational problems. An FMI should indicate the circumstances when management can exercise discretion and include appropriate procedures to minimise any conflict-of-interest issues that may arise.

Participants' understanding of rules, procedures, and risks

3.23.4. While the primary responsibility for understanding the rules, procedures, and risks of participating in the FMI rests with participants, the FMI should provide all necessary and appropriate documentation and training to facilitate understanding. New participants should receive training before using the system, and existing participants should receive additional periodic training, as needed. An FMI is well placed to observe the performance of participants and should promptly identify those participants that do not adequately understand its rules, procedures, and risks of participation. In such cases, an FMI should notify the senior management within the participant institution and, in cases of significant potential risk, notify the appropriate regulatory, supervisory, and oversight authorities.

Service fee schedule

3.23.5. An FMI should publicly disclose its fees at the level of the individual services it offers, provide clear descriptions of these services, and disclose policies on any available discounts. The FMI should provide clear descriptions of priced services for comparability purposes. The transparent public disclosure of service fees and discounts and service descriptions helps market participants evaluate the costs of using a particular service and compare these costs to those of alternative arrangements. Transparency of fees, however, will be undermined if an FMI bundles its fees for services or if it offers selective discounts to

¹³² Information on business continuity that can undermine an FMI's safety and soundness, such as location of back-up sites, should not be disclosed to the public. However, this information should be disclosed to the relevant authorities.

certain users without disclosing the basis for the discount. An FMI should therefore make detailed information on fees and services publicly available at the level of individual services to enable users to select only the services that they wish to use. An FMI should provide timely notice to participants and the public of any changes to services and fees.

Other information

3.23.6. An FMI should provide additional information as needed to further enhance the understanding of the activities and operations of the FMI. In particular, an FMI should provide a well-organised overview of risks and risk-management processes, in addition to the statement of rules and procedures, to help participants understand risks and manage them comprehensively. Other relevant information for participants and, more generally, the public, could include plain language summaries and general information on the full range of the FMI's activities and operations.¹³³ This general information, for example, may include the names of direct participants in the FMI, key times and dates in FMI operations, and overall risk-management frameworks (such as margin methodologies and assumptions). An FMI also should disclose its financial condition, financial resources to withstand potential losses, timeliness of settlements, and other performance statistics. At a minimum, an FMI should provide basic data on transaction volume and value. Other useful information that should be disclosed to participants, but typically not to the public, include key highlights of its business continuity arrangements, as well as details of stress tests and other data to help participants understand and manage their potential financial risks from participation in the FMI.¹³⁴

Principle 24: Disclosure of market data

A TR should provide timely and accurate data to relevant authorities and the public in line with their respective needs.

Key considerations

1. *A TR should provide data in line with regulatory and industry expectations to relevant authorities and the public, respectively, that is comprehensive and at a level of detail sufficient to enhance market transparency and support other public policy objectives.*
2. *A TR should have effective processes and procedures to provide data to relevant authorities in a timely and appropriate manner to enable them to meet their respective regulatory mandates and legal responsibilities.*
3. *A TR should have robust information systems that provide accurate current and historical data. Data should be provided in a timely manner and in a format that permits it to be easily analysed.*

Explanatory note

3.24.1. TRs may play a fundamental role in providing market transparency and, as such, effective access by relevant authorities and the public to the data recorded in TRs is critical. TRs are particularly important in the OTC derivatives markets. From a public policy

¹³³ A clear description of the typical lifecycle of the transaction, clearing, and settlement process under normal circumstances may also be useful for participants and the public. This information would highlight how the FMI processes a transaction, including the timeline of events, the validation and checks to which a transaction is subjected, and the responsibilities of the parties involved.

¹³⁴ In disclosing stress-test information, care must be taken to avoid revealing information regarding the positions of individual participants.

perspective, the data maintained and generated by the operations of a TR and on behalf of its participants should promote market transparency and foster public policy objectives, subject to relevant laws involving disclosures of sensitive information. Transparency to market participants supports investor protection as well as the exercise of market discipline. Transparency to the broader public helps build greater confidence in, and understanding of, markets, and informs and builds support for sound public policies. Authorities may identify other policy objectives specific to an individual TR's role in supporting market transparency in addition to these core policy objectives.

Disclosure of data

3.24.2. A TR should provide data in line with regulatory and industry expectations to relevant authorities and the public, respectively, that is comprehensive and at a level of detail sufficient to enhance market transparency and support other public policy objectives. The scope and level of detail of the data that a TR provides will vary depending on the respective information needs of relevant authorities, the TR's participants, and the public. At a minimum, a TR should provide aggregate data on open positions and transaction volumes and values and categorised data (for example, aggregated breakdowns of trading counterparties, reference entities, or currency breakdowns of products), as available and appropriate to the public. Relevant authorities should have access to additional data recorded in a TR, including participant level data, that is relevant to their respective regulatory mandates and legal responsibilities, which may include market regulation and surveillance, oversight of market infrastructures, prudential supervision, facilitating resolution of failed institutions, and systemic risk regulation.

Processes and procedures

3.24.3. A TR should have processes and procedures to provide data to relevant authorities in a timely and effective manner to enable them to meet their respective regulatory mandates and legal responsibilities. For example, a TR should have procedures to facilitate enhanced monitoring, special actions, or official proceedings taken by relevant authorities in relation to data regarding troubled or failed participants by making relevant information in the TR available in a timely and effective manner. The provision of data from a TR to relevant authorities should be supported from a legal, procedural, operational, and technological perspective. Where confidentiality and legal barriers in relevant jurisdictions restrict a TR's ability to provide data to relevant domestic or international authorities, the TR should communicate such restrictions to these authorities so that authorities can take appropriate action. A TR also should have a process in place to work with relevant authorities to resolve any data sharing restrictions and comply with applicable law where there are specific regulatory data needs.

Information systems

3.24.4. To meet the information needs of participants, authorities, and the public, a TR should have robust information systems to provide accurate current and historical data. A TR should collect, store, and provide data to participants, authorities and the public in a timely manner and in a format that can facilitate prompt analysis. Data should be made available that permits both comparative and historical analysis of the relevant markets. The criticality of a TR's or its market's role should be a consideration in the frequency and speed with which data and other information are disclosed. If a TR is one of several providing services to a particular market, the TR should provide basic data and other information in a manner that can be easily analysed and compared to information provided by others serving the market. A TR should consult with relevant authorities, including its regulatory, supervisory, or oversight authority in developing and maintaining a reporting framework that facilitates analysis and comparison of data from other TRs.

Forms of disclosure

3.24.5. A TR should make the data and other relevant information it discloses readily available through generally accessible media in a language commonly used in financial markets in addition to the domestic language(s) of the jurisdiction in which the TR is located. The data should be accompanied by robust documentation that enables users to understand and interpret the data correctly.

4.0. Responsibilities of central banks, market regulators, and other relevant authorities for financial market infrastructures

Responsibility A: Regulation, supervision, and oversight of FMIs

FMIs should be subject to appropriate and effective regulation, supervision, and oversight by a central bank, market regulator, or other relevant authority.

Key considerations

- 1. Authorities at the national level should publicly disclose the criteria used to identify FMIs that should be subject to regulation, supervision, and oversight.*
- 2. FMIs that have been identified using these criteria should be regulated, supervised, and overseen by appropriate authorities such as a central bank, market regulator, or other relevant body.*

Explanatory note

4.1.1. FMIs are critical components of domestic and international financial markets and help to maintain and promote financial stability in periods of market stress. FMIs provide a number of services that are vital to a well-functioning financial system, including facilitating the exchange of money for goods, services, and financial assets, and providing a safe and efficient means through which authorities can manage systemic risks and central banks can implement monetary policy. By design, FMIs concentrate payment, clearing, and settlement activities and trade data in order to better manage risk and to reduce payment, clearing, and settlement costs and delays. Because well-functioning FMIs can vastly improve the efficiency, transparency and safety of financial systems, and also can concentrate systemic risk, their appropriate regulation, supervision, and oversight is critical to the public policy goals set out in this report.

Criteria for regulation, supervision, and oversight

4.1.2. Relevant authorities at the national level should use publicly disclosed criteria to identify FMIs that should be regulated, supervised, and overseen. A basic criterion is the function of the FMI. For example, systemically important payment systems, CSDs, SSSs, CCPs, and TRs are typically subject to regulation, supervision, and oversight because of the critical role that they play in the financial system. More-detailed criteria that are often considered for various types of FMIs in determining the need or degree of regulation, supervision, and oversight include (a) the number and value of transactions processed; (b) the number and type of participants; (c) the markets served; (d) the market share controlled; (e) the interconnectedness with other FMIs and other financial institutions; and (f) the available alternatives to using the FMI at short notice. Authorities also may want to designate FMIs as systemically important on the basis of other criteria relevant in their jurisdictions for the purposes of applying the principles in this report. The precise framework for making such decisions will vary across jurisdictions. In some countries, for instance, there is a statutory framework, while in others, the central bank or other relevant authorities have greater discretion to set the criteria used.

Responsibilities for regulation, supervision, and oversight

4.1.3. The FMIs that have been identified by national authorities as appropriate candidates for regulation should be regulated, supervised, and overseen by appropriate authorities such as a central bank, market regulator, or other relevant body. The division of responsibilities among authorities for regulating, supervising, and overseeing FMIs varies depending on the applicable legal and institutional framework. Sources of authority or responsibility for

regulation, supervision, and oversight may take different forms. Preferably, legislation will clearly specify which authority has responsibility. For example, an authority may have regulatory, supervisory, or oversight responsibility for an FMI registered, chartered, licensed, or designated as an entity that falls within a specific legislative mandate. However, in the national context, an FMI also may be overseen by an authority that does not derive responsibility from a specific legislative mandate. Relevant authorities should address any existing gaps in regulation, supervision, and oversight of FMIs through coordination with the relevant legislative body to implement statutory changes where possible, or through other capabilities, including participation in industry discussions.¹³⁵

Responsibility B: Regulatory, supervisory, and oversight powers and resources

Central banks, market regulators, and other relevant authorities should have the powers and resources to carry out effectively their responsibilities in regulating, supervising, and overseeing FMIs.

Key considerations

1. *Authorities should have specific powers or other authority consistent with their relevant responsibilities, including the ability to obtain information and induce change.*
2. *Authorities should have sufficient resources to fulfil their regulatory, supervisory, and oversight responsibilities.*

Explanatory note

4.2.1. Central banks, market regulators, and other relevant authorities generally share the common objective of ensuring the safety and efficiency of FMIs. The primary responsibility for ensuring an FMI's safety and efficiency, however, lies with the system's owners and operator. Regulation, supervision, and oversight of the FMI are needed to ensure that the FMI fulfils this responsibility, to address negative externalities that can be associated with FMIs, and generally to foster financial stability. Regulators, supervisors, and overseers, whether they are central banks, market regulators, or other relevant authorities, should have the appropriate powers and resources in order to administer their regulatory, supervisory, and oversight responsibilities effectively. An authority's powers, which may be statutory or non-statutory, should be consistent with its relevant responsibilities.

Powers to obtain information

4.2.2. Authorities should have appropriate powers or other authority to obtain timely information necessary for effective regulation, supervision, and oversight. In particular, authorities should use these powers to access information that enables the authorities to understand and assess (a) an FMI's various functions, activities, and overall financial condition; (b) the risks borne or created by an FMI and, where appropriate, the participants; (c) an FMI's impact on its participants and the broader economy; and (d) an FMI's adherence to relevant regulations and policies. Key sources of information include official system documents and records, regular or ad-hoc reporting, internal reports from board meetings and internal auditors, on-site visits and inspections, information on operations outsourced to third parties, and dialogue with an FMI's board, management, or participants.¹³⁶ Authorities

¹³⁵ This includes traditional use of moral suasion by central banks.

¹³⁶ Official system documentation includes the FMI's rules, procedures, and business continuity plans. Regular or ad hoc reporting includes daily volume and value of transaction reports, operating performance reports, stress test results, and the scenarios and methodology employed in estimating exposures.

should have appropriate legal safeguards to protect all confidential and non-public information obtained from an FMI. Authorities, however, should be able to share relevant confidential or non-public information with other authorities, as appropriate, to minimise gaps and reduce duplication in regulation, supervision, and oversight.

Powers to induce change

4.2.3. Authorities also should have appropriate powers or other authority, or mechanisms to induce change in an FMI that is not complying with relevant regulations or policies. The mechanisms that could be used to effect change vary significantly, from dialogue and moral suasion to explicit statutory powers that enable the authority to enforce its decisions. Discussions with FMIs, their participants, and, in some cases, participants' customers play an important part in achieving regulatory, supervisory, and oversight objectives. In many cases, an authority may be able to rely on moral suasion to promote public policy interests for FMIs and their stakeholders and to carry out its regulatory, supervisory, and oversight responsibilities. These techniques, however, work best when there are credible regulatory or other remedies available to the relevant authorities. Where appropriate and legally permissible, authorities may want to consider publicly disclosing their assessments of certain FMIs as a means to induce change at those FMIs and promote transparency.

Sufficient resources

4.2.4. In promoting effective regulation, supervision, and oversight, authorities should have sufficient resources to carry out their regulatory, supervisory, and oversight responsibilities. Sufficient resources include adequate funding, qualified and experienced personnel, and appropriate ongoing training. In addition, authorities should adopt an organisational structure that uses these resources effectively. It should be clear where the responsibility for regulatory, supervisory, and oversight functions lies within a relevant authority or authorities. Regulatory, supervisory, and oversight functions may include gathering information on FMIs, assessing the operation and design of FMIs, taking action to promote FMIs' observance of relevant policies and standards, and conducting on-site visits or inspections when necessary. Where relevant, personnel should have appropriate legal protections so that they can carry out their responsibilities.

Responsibility C: Disclosure of policies with respect to FMIs

Central banks, market regulators, and other relevant authorities should clearly define and disclose their regulatory, supervisory, and oversight policies with respect to FMIs.

Key considerations

1. *Authorities should clearly define their policies with respect to FMIs, which include the authorities' objectives, roles, and regulations.*
2. *Authorities should publicly disclose their relevant policies in the regulation, supervision, and oversight of FMIs.*

Explanatory note

4.3.1. Central banks, market regulators, and other relevant authorities should clearly define their regulatory, supervisory, and oversight policies with respect to FMIs. Such policies include relevant objectives, roles, and regulations. A clear definition of an authority's objectives provides a basis for consistent policymaking and a benchmark by which the authority can evaluate its effectiveness. Typically, the primary objectives of an authority with respect to FMIs are to promote the safety and efficiency of FMIs. Particular authorities may have additional relevant public policy objectives for the FMIs they regulate, supervise, or

oversee. The objectives of an authority are usually implemented through specific regulations and other policies, such as risk-management standards or expectations for FMIs. The policies of an authority should be consistent with its legislative framework. In addition, authorities may find it beneficial to consult with the market, key stakeholders, and the broader public regarding their policies. In many countries, such consultations may be required by law.

4.3.2. Authorities should publicly disclose their policies with respect to FMIs. Public disclosure promotes consistent policies. Such disclosure typically involves communicating an authority's regulatory, supervisory, and oversight standards for FMIs, which helps establish clear expectations and facilitates compliance with those standards. Furthermore, disclosing policies publicly communicates the responsibilities and expectations of authorities to the wider public and thus promotes the accountability of those authorities. Authorities can publicly disclose their policies in a variety of forms, including plain-language documents, policy statements, and relevant supporting material that should be readily available.¹³⁷ These disclosures, however, do not shift the responsibility of ensuring the safe and efficient operation of FMIs from the FMI owners and operators to authorities. Authorities should emphasise that primary responsibility for complying with the regulatory, supervisory, and oversight principles rests with the FMIs themselves.

Responsibility D: Application of the principles for FMIs

Central banks, market regulators, and other relevant authorities should adopt, where relevant, internationally accepted principles for FMIs and apply them consistently.

Key considerations

1. *Authorities should adopt the principles set out in this report.*
2. *Authorities should ensure that these principles, at a minimum, are applied to all systemically important payment systems, CSDs, SSSs, CCPs, and TRs.*
3. *Authorities should apply these principles consistently within and across jurisdictions, including across borders and similar types of FMIs.*

Explanatory note

4.4.1. Central banks, market regulators, and other relevant authorities should adopt the principles set out in this report. The adoption and application of internationally accepted principles can greatly enhance regulatory, supervisory, and oversight efforts by relevant authorities. While the precise means through which the principles are applied will vary from jurisdiction to jurisdiction, all CPSS and IOSCO members are expected to apply the principles for FMIs to the relevant FMIs in their jurisdictions to the fullest extent possible allowed by the legal framework in their jurisdiction.¹³⁸ The adoption of internationally accepted principles supports the establishment of important minimum standards for risk management. International principles draw on the collective experience of many central banks, market regulators, and other relevant authorities, and have been subject to public consultation. The use of such principles helps to ensure that FMIs are safe and efficient.

¹³⁷ For example, by posting them to a public website.

¹³⁸ In some cases, specific legislation may be used to set out the precise regulatory framework and rules applicable to FMIs. In other cases, the relevant authorities may not need statutory authority to adopt them, though they may still need to create more detailed policies, rules, or regulations to implement them.

Scope of application of principles

4.4.2. Subject to appropriate authority, central banks, market regulators, and other relevant authorities should ensure that these internationally accepted principles, at a minimum, are applied to all systemically important payment systems, CSDs, SSSs, CCPs, and TRs. A payment system is systemically important if it has the potential to trigger or transmit systemic disruptions; this includes, among other things, systems that are the sole payment system in a country or the principal system in terms of the aggregate value of payments, and systems that mainly handle time-critical, high-value payments or settle payments used to effect settlement in other FMIs. The presumption is that all CSDs, SSSs, CCPs, and TRs are systemically important because of their critical roles in the markets they serve. Authorities should disclose which FMIs they do not regard as systemically important and to which they do not intend to apply the principles and provide a comprehensive and clear rationale. Conversely, authorities may disclose the criteria used to identify which FMIs are considered as systemically important and may disclose which FMIs they regard as systemically important against these criteria.

Consistent application of principles

4.4.3. Authorities should apply these internationally accepted principles consistently within and across jurisdictions, including across borders and similar types of FMIs. Consistent application of these principles is important because different systems may be dependent on each other, or in direct competition with each other, or both. The principles also represent common interests which make it easier for different authorities to work cooperatively and enhance the effectiveness and consistency of regulation, supervision, and oversight. This is particularly important because many FMIs operate across multiple jurisdictions. Authorities may apply more demanding requirements if and when they deem it appropriate to do so.

Compliance with internationally accepted principles

4.4.4. If an FMI is not in compliance with the applicable principles and therefore presents a risk to financial stability, the authorities should ensure, as far as possible within their responsibilities and powers, that an FMI takes prompt action to remedy its deficiencies. In cases of non-compliance that do not threaten financial stability, corrective action should still be taken, but a more gradual approach may be appropriate. Authorities should closely monitor newly formed or significantly changed FMIs.¹³⁹ Where central banks themselves own or operate FMIs, or key components of FMIs, they should apply, to the extent applicable, the same international standards to their own systems with the same rigor as other overseen systems. If a central bank is an operator of an FMI, as well as the overseer of private-sector FMIs, it needs to consider how to best address any possible conflicts of interest. In particular, it should avoid disadvantaging private-sector FMIs relative to those which it owns and operates.

Responsibility E: Cooperation with other authorities

Central banks, market regulators, and other relevant authorities should cooperate with each other, both domestically and internationally, as appropriate, in promoting the safety and efficiency of FMIs.

¹³⁹ In these instances, authorities should engage with the FMI at an early stage to foster public policy goals and identify opportunities to enhance safety and efficiency.

Key considerations

1. *Authorities should cooperate with each other both domestically and internationally, to support more-efficient and more-effective regulation, supervision, and oversight of FMIs.*
2. *Authorities should use current and evolving best practices on international cooperative arrangements in relation to internationally active FMIs.*
3. *Relevant authorities should coordinate as needed to ensure timely access to trade data recorded in a TR.*

Explanatory note

4.5.1. Central banks, market regulators, and other relevant authorities should cooperate with each other, domestically and internationally, to support their mutual objectives of safe and efficient FMIs, particularly those FMIs conducting business in multiple jurisdictions. Cooperative arrangements based on mutual assistance provide a mechanism whereby the responsibilities of an FMI's individual authorities can be fulfilled more efficiently and effectively. The justification for cooperation between the relevant authorities should take into account the risk profile of the FMI. Cooperative arrangements should be managed to deliver regulation, supervision, and oversight consistent with each relevant authority's responsibilities and without prejudice to their statutory or other responsibilities.¹⁴⁰ Cooperation also should minimise the duplication of effort and the burden on FMIs and the relevant authorities. Cooperation should seek to avoid inconsistency in policy approaches and reduce the probability of gaps in regulation, supervision, and oversight that could arise if authorities did not coordinate with each other.

Guidance on cooperation

4.5.2. In cooperating with other authorities, central banks, market regulators, and other relevant authorities should use existing and evolving principles on cooperative arrangements for the regulation, supervision, and oversight of FMIs. The appropriate structure of a particular cooperative arrangement will depend on the statutory responsibilities of these authorities and may depend on the systemic importance of the FMI to their respective jurisdictions. In particular, central banks should refer to the CPSS's *Central bank oversight of payment and settlement systems*, which was published in May 2005. Market regulators should refer to IOSCO's *Principles regarding cross-border supervisory cooperation*, which was published in May 2010. As these reports highlight, supervisory cooperation can be facilitated through a range of mechanisms, including: ad hoc cooperation; information-sharing arrangements such as memoranda of understanding; and supervisory colleges or regulatory networks aimed at coordinated oversight. The sharing of information can include the exchange of supervisory information, both public and non-public, as well as the exchange of perspectives on risk-management controls.

Guidance on international cooperation

4.5.3. Supervision of cross-border and multicurrency FMIs increasingly need to involve formal arrangements for consultation, cooperation, and the exchange of information because of the involvement of authorities from multiple jurisdictions. These cooperative arrangements may address complex issues involving mutual recognition of specific regulatory, supervisory, or oversight regimes. CPSS and IOSCO have separately prepared reports providing guidance on developing such cooperative arrangements among banking and securities

¹⁴⁰ Cooperative arrangements, however, should be consistent with an authority's statutory powers and other legal frameworks.

regulators, respectively. In addition to the reports noted above, relevant authorities should use current and evolving best practices on international cooperative arrangements in relation to internationally active FMIs.

4.5.4. CPSS guidance states that when an authority has identified issues that may materially affect another relevant authority, such as an actual or proposed FMI operating across borders or in multiple currencies, it should inform other relevant authorities.¹⁴¹ An FMI that operates across borders or in multiple currencies should be subject to day-to-day regulation, supervision, and oversight by an authority that accepts primary responsibility, although that could potentially be supplemented by a college of regulators, supervisors, and overseers. In most cases, the primary regulator, supervisor, or overseer is the relevant authority in the jurisdiction where the FMI is located, as it has the authority to provide effective regulation, supervision, and oversight and the relevant local market experience. Where appropriate, the primary regulator, supervisor, or overseer of the FMI in the jurisdiction where the FMI is located should seek to organise an effective process for cooperating and consulting with other relevant authorities to discuss and, where possible, seek consensus on common issues and keep each other informed of developments related to the FMI.¹⁴²

4.5.5. IOSCO guidance, similarly, promotes supervisory cooperation among securities regulators, particularly with regard to globally active entities, and notes that effective cooperation may help ensure the seamless and efficient supervision of regulated entities while minimising duplicative efforts. The IOSCO guidance discusses various approaches to such cooperation, taking into account differences in the legal frameworks and regulatory structures of various jurisdictions. In developing cooperative arrangements, the IOSCO guidance also notes that enhanced supervisory cooperation and information sharing among securities regulators should not be seen as replacing or superseding the domestic regulatory obligations of any regulator.

Ensuring appropriate access to TR trade data

4.5.6. Authorities directly responsible for the regulation, supervision, and oversight of a TR that maintains data pertaining to other jurisdictions should coordinate with other relevant authorities to ensure timely and effective access to market data and establish an appropriate data access process that is fair and consistent with the responsibilities of the other relevant authorities. All relevant authorities should mutually support each other's access to data in which they have a material interest in furtherance of their regulatory, supervisory, and oversight responsibilities, regardless of the particular organisational form or geographic location of a TR.¹⁴³

¹⁴¹ Relevant authorities may include central banks of issue for the currencies used in the FMI and the relevant authorities where the FMI is located.

¹⁴² The primary regulator, supervisor, or overseer and other appropriate authorities should formalise, as appropriate, international cooperative arrangements in a memorandum of understanding or other form of documentation.

¹⁴³ See access to data by authorities in FSB, *Implementing OTC derivatives market reforms*, October 2010.

Annex A: Mapping of existing standards to proposed standards

The table below maps the existing CPSIPS, RSSS, and RCCP standards to the proposed standards in this consultative report.

CPSIPS	Consultative report principle or responsibility
1	Principle 1: Legal basis
2	Principle 23: Disclosure of rules and key procedures
3	Principle 3: Framework for the comprehensive management of risks
4	Principle 8: Settlement finality
5	Principle 4: Credit risk; Principle 5: Collateral; Principle 7: Liquidity risk
6	Principle 9: Money settlements
7	Principle 17: Operational risk
8	Principle 21: Efficiency and effectiveness
9	Principle 18: Access and participation requirements
10	Principle 2: Governance
RSSS	Consultative report principle or responsibility
1	Principle 1: Legal basis
2	Annex C
3	Annex C
4	Annex C
5	Annex C
6	Principle 11: Central securities depositories; Annex C
7	Principle 12: Exchange-of-value settlement systems
8	Principle 8: Settlement finality
9	Principle 4: Credit risk; Principle 5: Collateral
10	Principle 9: Money settlements
11	Principle 17: Operational risk
12	Principle 14: Segregation and portability; Principle: 16: Custody and investment risk; Annex C
13	Principle 2: Governance
14	Principle 18: Access and participation requirements
15	Principle 21: Efficiency and effectiveness
16	Principle 22: Communications procedures and standards
17	Principle 23: Disclosure of rules and key procedures
18	Responsibilities of central banks, market regulators, and other relevant authorities
19	Principle 20: FMI links
RCCP	Consultative report principle or responsibility
1	Principle 1: Legal basis
2	Principle 18: Access and participation requirements
3	Principle 4: Credit risk
4	Principle 5: Collateral; Principle 6: Margin
5	Principle 4: Credit risk; Principle 5: Collateral; Principle 6: Margin; Principle 7: Liquidity risk
6	Principle 13: Participant-default rules and procedures
7	Principle 16: Custody and investment risk
8	Principle 17: Operational risk
9	Principle 9: Money settlements
10	Principle 10: Physical deliveries; Principle 12: Exchange-of-value settlement systems
11	Principle 20: FMI links
12	Principle 21: Efficiency and effectiveness
13	Principle 2: Governance
14	Principle 23: Disclosure of rules and key procedures
15	Responsibilities of central banks, market regulators, and other relevant authorities

Annex B: Mapping of proposed standards to existing standards

The table below illustrates how the proposed standards in this consultative report relate to the existing CPSIPS, RSSS, and RCCP standards. For example, the proposed principle 18 harmonises and builds upon CPSIPS principle 9, RSSS recommendation 14, and RCCP recommendation 2.

Consultative report	CPSIPS	RSSS	RCCP
Principles for FMIs			
Principle 1: Legal basis	1	1	1
Principle 2: Governance	10	13	13
Principle 3: Framework for the comprehensive management of risks	3	-	-
Principle 4: Credit risk	5	9	3, 5
Principle 5: Collateral	5	9	4, 5
Principle 6: Margin	-	-	4, 5
Principle 7: Liquidity risk	5	-	5
Principle 8: Settlement finality	4	8	-
Principle 9: Money settlements	6	10	9
Principle 10: Physical deliveries	-	-	10
Principle 11: Central securities depositories	-	6	-
Principle 12: Exchange-of-value settlement systems	-	7	10
Principle 13: Participant-default rules and procedures	-	-	6
Principle 14: Segregation and portability	-	12	-
Principle 15: General business risk	-	-	-
Principle 16: Custody and investment risk	-	12	7
Principle 17: Operational risk	7	11	8
Principle 18: Access and participation requirements	9	14	2
Principle 19: Tiered participation arrangements	-	-	-
Principle 20: FMI links	-	19	11
Principle 21: Efficiency and effectiveness	8	15	12
Principle 22: Communications procedures and standards	-	16	-
Principle 23: Disclosure of rules and key procedures	2	17	14
Principle 24: Disclosure of market data	-	-	-
Responsibilities of central banks, market regulators, and other relevant authorities for FMIs			
Responsibility A: Regulation, supervision, and oversight of FMIs	A	18	15
Responsibility B: Regulatory, supervisory and oversight powers and resources	C	18	15
Responsibility C: Disclosure of objectives and policies	A	18	15
Responsibility D: Application of the principles for FMIs	B, C	-	-
Responsibility E: Cooperation with other authorities	D	18	15

Note: Additional source documents for the section on responsibilities of central banks, market regulators, and other relevant authorities include: CPSS, *Central bank oversight of payment and settlement systems*, May 2005, and IOSCO, *Principles regarding cross-border supervisory cooperation*, May 2010.

Annex C: Selected RSSS marketwide recommendations

The RSSS marketwide recommendations on trade confirmation, settlement cycle, CCPs, and securities lending were not part of the CPSS and Technical Committee of IOSCO's review of standards for FMIs. As such, these marketwide recommendations remain in effect and are provided below as reference.

Recommendation 2: Trade confirmation

Confirmation of trades between direct market participants should occur as soon as possible after trade execution, but no later than trade date (T+0). Where confirmation of trades by indirect market participants (such as institutional investors) is required, it should occur as soon as possible after trade execution, preferably on T+0, but no later than T+1.

3.10 The first step in settling a securities trade is to ensure that the buyer and the seller agree on the terms of the transaction, a process referred to as trade confirmation. Often a broker-dealer or member of an exchange (a direct market participant) acts as an intermediary in executing trades on behalf of others (indirect market participants). In such circumstances, trade confirmation often occurs on two separate tracks: confirmation of the terms of the trade between direct participants and confirmation (sometimes termed "affirmation") of the intended terms between each direct participant and the indirect participant for whom the direct participant is acting. (Generally, indirect market participants for whom confirmations are required include institutional investors and cross-border clients.) On both tracks, agreement of trade details should occur as soon as possible so that errors and discrepancies can be discovered early in the settlement process. Early detection should help to avoid errors in recording trades, which could result in inaccurate books and records, increased and mismanaged market risk and credit risk, and increased costs. While this process is occurring, the back offices of the direct market participants, indirect market participants and custodians that act as agents for the indirect market participants need to prepare settlement instructions, which should be matched prior to the settlement date. Speedy, accurate verification of trades and matching settlement instructions is an essential precondition for avoiding settlement failures, especially when the settlement cycle is relatively short. (See Recommendation 3 regarding the length of settlement cycles.)

3.11 Trade confirmation systems are increasingly becoming automated. Many markets already have in place systems for the automatic comparison of trades between direct market participants. (In many markets, the use of electronic trading systems obviates the need for direct market participants to match the terms of the trade.) Automated matching systems are also being proposed and implemented for trade confirmation between direct market participants and indirect market participants and for the matching of settlement instructions. Automation improves processing times by eliminating the requirement to send information back and forth manually between parties and by avoiding the errors inherent in manual processing.

3.12 At its most sophisticated, automation allows manual intervention to be eliminated from post-trade processing through the implementation of straight through processing (STP), that is, procedures that require trade data to be entered only once and then use those same data for all post-trade requirements related to settlement. Many practitioners believe that market-wide achievement of STP is essential, both for maintaining high settlement rates as volumes increase and for ensuring timely settlement of cross-border trades, particularly if reductions in settlement cycles are to be achieved. STP systems may use a common message format or use a translation facility that either converts different message formats into a common format or translates between different formats. Several initiatives aim to achieve STP. These initiatives should be encouraged, and direct and indirect market participants should achieve the degree of internal automation necessary to take full advantage of whatever solutions emerge.

Recommendation 3: Settlement cycles

Rolling settlement should be adopted in all securities markets. Final settlement should occur no later than T+3. The benefits and costs of a settlement cycle shorter than T+3 should be evaluated.

3.13 Under a rolling settlement cycle, trades settle a given number of days after the trade date rather than at the end of an “account period”, thereby limiting the number of outstanding trades and reducing aggregate market exposure. The longer the period from trade execution to settlement, the greater the risk that one of the parties may become insolvent or default on the trade, the larger the number of unsettled trades, and the greater the opportunity for the prices of the securities to move away from the contract prices, thereby increasing the risk that non-defaulting parties will incur a loss when replacing the unsettled contracts. In 1989, the G30 recommended that final settlement of cash transactions should occur on T+3, that is, three business days after the trade date. However, the G30 recognised that “to minimise counterparty risk and market exposure associated with securities transactions; same day settlement is the final goal”.

3.14 This recommendation retains T+3 settlement as a minimum standard. Markets that have not yet achieved a T+3 settlement cycle should identify impediments to achieving T+3 and actively pursue the removal of those impediments. Many markets already are settling at a shorter interval than T+3. For example, many government securities already settle on T+1 or even T+0, and some equity markets are currently considering a T+1 settlement cycle. The standard judged appropriate for a type of security or market will depend upon factors such as transaction volume, price volatility and the extent of cross-border trading in the instrument. Each securities market should evaluate whether a cycle shorter than T+3 is appropriate, given the risk reduction benefits that could be achieved, the costs that would be incurred and the availability of alternative means of limiting pre-settlement risk, such as trade netting through a CCP (see Recommendation 4 below). Depending on these factors, some markets may conclude that different types of securities should have different settlement cycles.

3.15 Reducing the cycle is neither costless nor without certain risks. This is especially true for markets with significant cross-border activity because differences in time zones and national holidays, and the frequent involvement of multiple intermediaries, make timely trade confirmation more difficult. In most markets, a move to T+1 (perhaps even to T+2) would require a substantial reconfiguration of the trade settlement process and an upgrade of existing systems. For markets with a significant share of cross-border trades, substantial system improvements may be essential for shortening settlement cycles. Without such investments, a move to a shorter cycle could generate increased settlement fails, with a higher proportion of participants unable to agree and exchange settlement data or to acquire the necessary resources for settlement in the time available. Consequently, replacement cost risk would not be reduced as much as anticipated and operational risk and liquidity risk could increase.

3.16 Regardless of the settlement cycle, the frequency and duration of settlement failures should be monitored closely. In some markets, the benefits of T+3 settlement are not being fully realised because the rate of settlement on the contractual date falls significantly short of 100%. In such circumstances, the risk implications of the fail rates should be analysed and actions identified that could reduce the rates or mitigate the associated risks. For example, monetary penalties for failing to settle could be imposed contractually or by market authorities; alternatively, failed trades could be marked to market and, if not resolved within a specified timeframe, closed out at market prices.

Recommendation 4: Central counterparties (CCPs)

The benefits and costs of a CCP should be evaluated. Where such a mechanism is introduced, the CCP should rigorously control the risks it assumes.

3.17 A central counterparty (CCP) interposes itself between trade counterparties, becoming the buyer to every seller and the seller to every buyer. Thus, from the point of view of market participants the credit risk of the CCP is substituted for the credit risk of the other participants. (In some markets many of the benefits of a CCP are achieved by establishing an entity that indemnifies market participants against losses from counterparty defaults without actually acting as CCP.) If a CCP manages its risks effectively, its probability of default may be less than that of all or most of the market participants. Moreover, a CCP often bilaterally nets its obligations vis-à-vis its participants, which achieves multilateral netting of each participant's obligations vis-à-vis all of the other participants. This can reduce substantially the potential losses in the event of the default of a participant, both on trades that have not reached settlement (replacement cost exposures) and on trades in the process of settlement (principal exposures). In addition, netting reduces the number and value of deliveries and payments needed to settle a given set of trades, thereby reducing liquidity risks and transaction costs.

3.18 Introduction of a CCP is another tool, in addition to shortening settlement cycles, for reducing counterparty credit risks. It is especially effective for reducing risks vis-à-vis active market participants, who often buy and sell the same security for settlement on the same date. In addition to these risk reduction benefits, the growing demand for CCP arrangements in part reflects the increasing use of anonymous electronic trading systems, where orders are matched according to the rules of the system and participants cannot always manage their credit risks bilaterally through their choice of counterparty.

3.19 Nevertheless, a CCP will not be appropriate in all markets. Establishing a CCP is not without costs. In particular, establishing the kind of robust risk-management system that a CCP must have (see discussion below) generally requires significant initial investments and ongoing expenses. Thus, individual markets should assess carefully the balance of the benefits and costs of a CCP. This balance will depend on factors such as the volume and value of transactions, trading patterns among counterparties, and the opportunity costs associated with settlement liquidity. A growing number of markets have determined that the benefits of implementing a CCP outweigh the costs.

3.20 If a CCP is established, it is important that it have sound risk management because the CCP assumes responsibility for risk management and reallocates risk among its participants through its policies and procedures. As a result, if a CCP does not perform risk management well, the CCP could increase risk to market participants. The ability of the system as a whole to withstand the default of individual participants depends crucially on the risk-management procedures of the CCP and its access to resources to absorb financial losses. The failure of a CCP would almost certainly have serious systemic consequences, especially where multiple markets are served by one CCP. Consequently, a CCP's ability to monitor and control the credit, liquidity, legal and operational risks it incurs and to absorb losses is essential to the sound functioning of the markets it serves. A CCP must be able to withstand severe shocks, including defaults by one or more of its participants, and its financial support arrangements should be evaluated in this context. Furthermore, there must be a sound and transparent legal basis for the netting arrangements, whether by novation or otherwise. For example, netting must be enforceable against the participants in bankruptcy. Without such legal underpinnings, net obligations may be challenged in judicial or administrative insolvency proceedings. If these challenges are successful, the CCP or the original counterparty may face additional settlement exposure. The CCP must also be operationally sound and must ensure that its participants have the incentive and the ability to manage the risks they assume.

3.21 CCPs adopt a variety of means to control risk. The precise means reflects the market served and the nature of the risks incurred. Access criteria are essential (see Recommendation 14 on access). The CCP's exposures should be collateralised. Most CCPs require members to deposit collateral to cover potential market movements on open positions or unsettled transactions. Positions are also generally marked to market one or more times daily, with the CCP taking additional cash or collateral to cover any changes in the net value of the open positions of participants since the previous valuation and settlement. During volatile periods, CCPs may collect additional collateral to minimise further their exposure. CCPs should also have rules specifying clearly how defaults will be handled and how losses will be shared in the event that a defaulting firm's collateral fails to cover its exposure. For example, CCPs may require their members to contribute to default clearing funds, typically composed of cash or high-quality, liquid securities and calculated using a formula based on the volume of the participant's settlement activity. Those funds are often augmented through insurance or other financial support. Liquidity demands are usually met by some combination of clearing fund assets and firmly committed bank credit lines. Rules and procedures for handling defaults should be transparent to enable members and other market participants to assess the risks they assume because of their membership in and use of a CCP.

3.22 CCPs are currently developing global risk-management standards that draw on their common experience and expertise. In February 2001, senior executives of the European Association of Central Counterparty Clearing Houses (EACH) developed risk-management standards for their organisations. Subsequently, CCP-12, a group that includes CCPs from Asia and the Americas as well as Europe, has been working to revise the EACH standards and broaden their acceptance among CCPs.¹⁴⁴ Once CCP-12's work is finalised, national authorities should consider using it as a starting point when evaluating the risk-management procedures of a CCP.

Recommendation 5: Securities lending

Securities lending and borrowing (or repurchase agreements and other economically equivalent transactions) should be encouraged as a method for expediting the settlement of securities transactions. Barriers that inhibit the practice of lending securities for this purpose should be removed.

3.23 Mature and liquid securities lending markets (including markets for repurchase agreements and other economically equivalent transactions) generally improve the functioning of securities markets by allowing sellers ready access to securities needed to settle transactions where those securities are not held in inventory, by offering an efficient means of financing securities portfolios, and by supporting participants' trading strategies.¹⁴⁵ The existence of liquid markets for securities lending reduces the risks of failed settlements because market participants with an obligation to deliver securities that they have failed to receive and do not hold in inventory can borrow these securities and complete delivery. Securities lending markets also enable market participants to cover transactions that have already failed, thereby curing the failure sooner. In cross-border transactions, particularly

¹⁴⁴ The CCP-12 is composed of the following entities: (1) the Australian Stock Exchange; (2) the Brazilian Clearing and Depository Corporation; (3) Eurex Clearing; (4) the Chicago Mercantile Exchange; (5) Clearnet; (6) Hong Kong Exchanges and Clearing Limited; (7) the London Clearing House; (8) S D Indeval, SA de C V; (9) Singapore Exchange Limited; (10) The Canadian Depository for Securities Limited; (11) The Depository Trust & Clearing Corporation; (12) The Options Clearing Corporation; and (13) the Tokyo Stock Exchange.

¹⁴⁵ For a thorough discussion of securities lending and repo agreements, see Technical Committee of IOSCO and CPSS, *Securities lending transactions: market development and implications*, 1999; CGFS, *Implications of repo markets for central banks*, 1999.

back-to-back transactions, it is often more efficient and cost-effective for a market participant to borrow a security for the delivery than to deal with the risk and costs associated with a settlement failure.

3.24 Liquid securities lending markets are therefore to be encouraged, subject to appropriate limits on their use for purposes prohibited by regulation or law. For example, borrowing to support short sales is illegal in some circumstances in some markets. Even in jurisdictions that restrict securities lending because of other public policy concerns, authorities should consider permitting lending to reduce settlement failures. Impediments to the development and functioning of securities lending markets should, as far as possible, be removed. In many markets, the processing of securities lending transactions involves manually intensive procedures. In the absence of robust and automated procedures, errors and operational risks increase, and it may be difficult to achieve timely settlement of securities lending transactions, which often need to settle on a shorter cycle than regular trades. The scope for improvement in the processing of cross-border borrowing and lending transactions is particularly large. Some CSDs seek to overcome these impediments by providing centralised lending facilities; others offer services intended to support the bilateral lending market. The needs of individual markets will differ, and market participants and CSDs should evaluate the usefulness of the different types of facilities.

3.25 Other impediments might arise from tax or accounting policies, from legal restrictions on lending, from an inadequate legal underpinning for securities lending or from ambiguities about the treatment of such transactions in a bankruptcy. One of the most significant barriers to development may be related to taxation of securities lending transactions. A tax authority's granting of tax neutrality to the underlying transaction and the elimination of certain transaction taxes have served to increase activity in several jurisdictions. Accounting standards also have an influence on the securities lending market, particularly with respect to whether, and under what conditions, collateral must be reflected on the balance sheet. Authorities in some jurisdictions restrict the types or amounts of securities that may be loaned, the types of counterparties that may lend securities, or the permissible types of collateral. Uncertainty about the legal status of transactions, for example their treatment in insolvency situations, also inhibits development of a securities lending market. The legal and regulatory structure must be clear so that all parties involved understand their rights and obligations.

3.26 While securities lending may be a useful tool, it presents risk to both the borrower and the lender. The securities lent or the collateral may not be returned when needed, because of counterparty default, operational failure or legal challenge, for example. Those securities would then need to be acquired in the market, perhaps at a cost. Counterparties to securities loans should employ appropriate risk-management policies, including conducting credit evaluations, collateralising exposures, marking exposures and collateral to market daily, and employing master legal agreements.

Recommendation 6: Central securities depositories (CSDs)

Securities should be immobilised or dematerialised and transferred by book entry in CSDs to the greatest extent possible.

3.27 There are several different ways for beneficial owners to hold securities. In some jurisdictions, physical securities circulate and beneficial owners may keep securities in their possession, although beneficial owners typically employ a custodian to hold them to reduce risks and safekeeping costs. The costs and risks associated with owning and trading securities may be reduced considerably through immobilisation of physical securities, which involves concentrating the location of physical securities in a depository (or CSD). To promote immobilisation of all certificates of a particular issue, a jurisdiction could encourage the issuance of a global note, which represents the whole issue. A further step away from circulating physical securities is full dematerialisation of a securities issue. In this approach,

there is no global note issued, as the rights and obligations stem from book entries in an electronic register.

3.28 In addition to differences in physical arrangements for holding securities, there are important differences in the legal arrangements. Holding systems may be categorised generally as direct or indirect (see annex 2 of the RSSS). Each type of system has advantages and disadvantages and either type of system can be designed in a manner that complies with these Recommendations. In jurisdictions that operate a direct holding system but in which the CSD is not the official registrar of the issuer, a transfer of securities in the CSD should result automatically in the transfer of legal title to the securities in the official register of the issuer.

3.29 The immobilisation or dematerialisation of securities and their transfer by book entry within a CSD significantly reduces the total costs associated with securities settlements and custody. By centralising the operations associated with custody and transfer within a single entity, costs can be reduced through economies of scale. In addition, efficiency gains can be achieved through increased automation, which reduces the errors and delays inherent in manual processing. By reducing costs and improving the speed and efficiency of settlement, book entry settlement also supports the development of securities lending markets, including markets for repurchase agreements and other economically equivalent transactions. These activities, in turn, enhance the liquidity of securities markets and facilitate the use of securities collateral to manage counterparty risks, thereby increasing the efficiency of trading and settlement. Effective governance (see Recommendation 13) is necessary, however, to ensure that these benefits are not lost as a result of monopolistic behaviour by the CSD.

3.30 The immobilisation or dematerialisation of securities also reduces or eliminates certain risks, for example destruction or theft of certificates. The transfer of securities by book entry is a precondition for the shortening of the settlement cycle for securities trades, which reduces replacement cost risks. Book entry transfer also facilitates delivery versus payment, thereby eliminating principal risks.

3.31 Thus, for both safety and efficiency reasons, securities should be immobilised or dematerialised in CSDs to the greatest extent possible. In practice, retail investors may not be prepared to give up their certificates. However, it is not necessary to achieve complete immobilisation to realise the benefits of CSDs. It may be sufficient that the most active market participants immobilise their holdings. Less active investors that insist on holding certificates should bear the costs of their decisions.

Recommendation 12: Protection of customers' securities

Entities holding securities in custody should employ accounting practices and safekeeping procedures that fully protect customers' securities. It is essential that customers' securities be protected against the claims of a custodian's creditors.

3.60 Custody risk is the risk of a loss on securities held in custody occasioned by a custodian's (or subcustodian's) insolvency, negligence, misuse of assets, fraud, poor administration, inadequate record keeping, or failure to protect a customer's interests in securities (including voting rights and entitlements).¹⁴⁶ Although custodians are predominantly commercial banks, CSDs also hold and administer securities on behalf of their direct participants, and thus present custody risk. (Direct participants in a CSD may hold securities both for their own account and on behalf of customers.)

¹⁴⁶ For a thorough discussion of custody issues, see Technical Committee of IOSCO, *Client Asset Protection*, 1996.

3.61 A custodian should employ procedures ensuring that all customer assets are appropriately accounted for and kept safe whether it holds them directly or through a subcustodian. Because customer securities must also be protected against the claims of a custodian's creditors, a customer's claims against a custodian are typically given priority or are given preferential treatment under insolvency law. (Nonetheless, customer assets could be subject to liens in favour of the custodian if, for example, the customer has pledged them to secure an obligation to the custodian.) One way that a customer can be protected in the event of a custodian's insolvency is through segregation (identification) of customer securities on the books of the custodian (and of all subcustodians, and ultimately, the CSD). Even when customer securities are segregated from a custodian's own securities, customers may still be at risk of a loss if the custodian does not hold sufficient securities to satisfy all customer claims or if an individual customer's securities cannot be readily identified. Thus, entities that hold securities in custody (or maintain records of balances of securities) should reconcile their records regularly to keep them current and accurate. Other ways to safeguard or protect customers against misappropriation and theft include internal controls and insurance or other compensation schemes.

3.62 Ideally, a customer's securities are immune from claims made by third-party creditors of the custodian. Although the ideal is not realised in all circumstances, when the entities through which securities are held are performing their responsibilities effectively, the likelihood of a successful legal claim made on a customer's securities by a third-party creditor is minimised. In addition, in the event of a custodian's or subcustodian's insolvency, it should be highly improbable that a customer's securities could be frozen or made unavailable for an extended period of time. If that were to happen, the customer could come under liquidity pressures, suffer price losses or fail to meet its obligations. Segregation is a common device that facilitates the movement of a customer's positions by a receiver to a solvent custodian, thereby enabling customers to manage their positions and meet their settlement obligations. To bring these results about, it is essential that the legal framework support segregation of customer assets or other arrangements for prioritising claims in bankruptcy that serve to protect customers' holdings. It is also important for supervisory authorities to enforce effective segregation of customer assets by custodians.

3.63 Cross-border holdings of securities often involve several layers of intermediaries acting as custodians. For example, an institutional investor may hold its securities through a global custodian, which, in turn, holds securities in a subcustodian that is a member of the local CSD. Or a broker-dealer may hold its securities through its home country CSD or an international CSD, which, in turn, holds its securities through a cross-border link with the local CSD or through a local custodian. Mechanisms to protect customer assets may vary depending on the type of securities holding system instituted in a jurisdiction. Beneficial owners of securities should understand the extent of a custodian's responsibility for securities held through intermediate custodians.

3.64 To prevent unexpected losses, a global custodian should determine whether the legal framework in the jurisdiction of each of its local subcustodians has appropriate mechanisms to protect customer assets. Alternatively, a global custodian should keep its customers apprised of the custody risk arising from holding securities in a particular jurisdiction. Global custodians should also ascertain whether their local subcustodians employ appropriate accounting, safekeeping and segregation procedures for customer securities. Likewise, when home country CSDs and ICSDs establish links to other CSDs, they should ensure that those other CSDs protect customer securities adequately. With complex cross-border arrangements, it is imperative that sound practices and procedures be used by all entities in the chain of custodians so that the interests of beneficial owners are protected from legal actions relating to the insolvency of, or the commission of fraud by, any one of the custodians. Each jurisdiction should take the attributes of its securities holding system into account in judging whether its legal framework includes appropriate mechanisms to protect a custodian's customer against loss upon the insolvency of, or the commission of fraud by, a custodian.

Annex D: Matrix of applicability of key considerations to specific types of FMIs

Key considerations	Payment systems	CSDs	SSSs	CCPs	TRs
Principle 1: Legal basis	•	•	•	•	•
1. The legal basis should provide a high degree of certainty for each aspect of an FMI's activities in all relevant jurisdictions.	•	•	•	•	•
2. An FMI should have rules, procedures, and contracts that are clear, understandable, and consistent with relevant laws and regulations.	•	•	•	•	•
3. An FMI should be able to articulate the legal basis for its activities to relevant authorities, participants, and, where relevant, participants' customers, in a clear and understandable way.	•	•	•	•	•
4. An FMI should have rules, procedures, and contracts that are enforceable in all relevant jurisdictions, even when a participant defaults or becomes insolvent. There should be a high degree of certainty that actions taken under such rules and procedures will not be stayed, voided, or reversed.	•	•	•	•	•
5. An FMI conducting business in multiple jurisdictions should identify and mitigate the risks arising from any potential conflicts of laws across jurisdictions.	•	•	•	•	•
Principle 2: Governance	•	•	•	•	•
1. An FMI should have documented governance arrangements that provide clear and direct lines of responsibility and accountability. These arrangements should be disclosed to owners, relevant authorities, users, and, at a more general level, the public.	•	•	•	•	•
2. An FMI should have objectives that place a high priority on the safety and efficiency of the FMI and explicitly support financial stability and other relevant public interests.	•	•	•	•	•
3. The roles and responsibilities of an FMI's board of directors (or equivalent) should be clearly specified, and there should be documented processes for its functioning, including processes to identify, address, and manage member conflicts of interest. The roles and responsibilities of management should also be clearly specified.	•	•	•	•	•
4. The board should contain suitable members with the appropriate skills and incentives to fulfil its multiple roles. This typically requires the inclusion of independent board member(s). The board should review its overall performance and that of its individual board members regularly.	•	•	•	•	•
5. The board should establish a clear, documented risk-management framework that includes the FMI's risk-tolerance policy, assigns responsibilities and accountability for risk decisions, and addresses decision making in crises and emergencies. Governance arrangements should ensure that the risk-management and internal control functions have sufficient authority, independence, resources, and access to the board.	•	•	•	•	•
6. The board should ensure that the FMI's overall strategy, rules, and major decisions reflect appropriately the interests of its participants and other relevant stakeholders. Major decisions should be clearly disclosed to relevant stakeholders and, where there is a broad market impact, the public.	•	•	•	•	•

Key considerations	Payment systems	CSDs	SSSs	CCPs	TRs
Principle 3: Framework for the comprehensive management of risks	•	•	•	•	•
1. An FMI should have risk-management policies, procedures, and systems that identify, measure, monitor, and manage the range of risks that arise in the FMI.	•	•	•	•	•
2. An FMI should provide the incentives and, where relevant, the capacity to participants and their customers to manage and contain their risks.	•	•	•	•	•
3. An FMI should regularly review the material risks it bears from and poses to other entities (such as linked FMIs, settlement banks, liquidity providers, or service providers) as a result of interdependencies and develop appropriate risk-management tools to address these risks.	•	•	•	•	•
Principle 4: Credit risk	•	•	•	•	
1. An FMI should establish a robust framework to manage the credit risks from its participants and the credit risks involved in its payment, clearing, and settlement processes. Credit risk may arise from current exposure, potential future exposure, or both.	•	•	•	•	
2. An FMI should identify sources of credit risk, routinely measure and monitor credit exposures, and use appropriate risk-management tools to control these risks.	•	•	•	•	
3. A payment system, CSD, or SSS should cover its <i>current and, where they exist, potential future exposures</i> to each participant fully with a high degree of confidence using collateral and other equivalent financial resources (see principle 5 on collateral).	•	•	•		
4. A CCP should cover its <i>current and potential future exposures</i> to each participant fully with a high degree of confidence using margin and other financial resources (see principle 6 on margin which specifies 99 percent initial margin coverage and other requirements). A CCP should also maintain <i>additional</i> financial resources sufficient to cover a wide range of potential stress scenarios identified in regular and rigorous stress testing that should include, but not be limited to, the default of [one /two] participant[s] and [its/their] affiliates that would potentially cause the largest aggregate credit exposure[s] in extreme but plausible market conditions.				•	
5. A CCP should determine and test regularly the sufficiency of its financial resources by rigorous backtesting and stress testing. Backtesting should be conducted daily to demonstrate sufficient initial margin coverage with a 99 percent degree of confidence. Stress tests to check the adequacy of the total financial resources available in the event of a default in extreme but plausible market conditions should be performed at least monthly, or more frequently when the products cleared or markets served in general display high volatility, become less liquid, or when the size or concentration of positions held by a CCP's participants increases significantly. In addition, more routine daily or weekly stress testing in which a CCP stresses the current positions of its participants using established parameters and assumptions should be considered to be a best practice. Comprehensive stress tests, involving a full validation of models, parameters, and assumptions and reconsideration of appropriate stress scenarios, should be conducted at least annually.				•	

Key considerations	Payment systems	CSDs	SSSs	CCPs	TRs
6. In conducting stress testing, a CCP should consider a wide range of relevant stress scenarios, including peak historic price volatilities, shifts in other market factors such as price determinants and yield curves, multiple defaults over various time horizons, simultaneous pressures in funding and asset markets, and a spectrum of forward-looking stress scenarios in a variety of extreme but plausible market conditions. The stress-testing programme should include “reverse stress tests” aimed at identifying extreme market conditions for which the CCP’s financial resources would be insufficient.				•	
7. An FMI should have clear and transparent rules and procedures that address how potentially uncovered credit losses would be allocated, including in relation to the repayment of any funds an FMI may borrow from liquidity providers. An FMI’s rules and procedures should also indicate its process to replenish any financial resources it may employ during a stress event, including the potential default of the two participants and their affiliates that would cause the largest aggregate credit exposure so that the FMI can continue to operate in a safe and sound manner.	•	•	•	•	
Principle 5: Collateral	•	•	•	•	
1. An FMI should generally limit the assets it (routinely) accepts as collateral to those with low credit, liquidity, and market risk.	•	•	•	•	
2. An FMI should establish prudent valuation practices and develop haircuts that are regularly tested and take into account stressed market conditions.	•	•	•	•	
3. An FMI should avoid the concentration of holdings of certain assets because of potential concerns about the ability to liquidate such assets quickly without significant adverse price effects.	•	•	•	•	
4. An FMI should establish stable and conservative haircuts that are calibrated to include periods of stressed market conditions in order to reduce the need for procyclical adjustments.	•	•	•	•	
5. An FMI that accepts cross-border collateral should mitigate the risks associated with its use and ensure that the collateral can be used in a timely manner.	•	•	•	•	
6. An FMI should have a well-designed and operationally flexible collateral management system to accommodate changes in the ongoing monitoring and management of collateral.	•	•	•	•	
Principle 6: Margin				•	
1. A CCP should establish margin levels that are commensurate with the risks and unique attributes of each product, portfolio, and market it serves, taking into account potential increases in liquidation times in stressed markets.				•	
2. A CCP should have a reliable source of timely price data for its margin models and regular collection of variation margin. A CCP should also have procedures and sound valuation models for addressing circumstances where pricing data is not readily available or reliable. As an input for its initial margin models, a CCP should rely upon pricing data covering an appropriate historical time period for the products it clears.				•	

Key considerations	Payment systems	CSDs	SSSs	CCPs	TRs
<p>3. A CCP should adopt initial margin models and parameters that are risk-based and generate margin requirements sufficient to cover potential future exposure to participants in the interval between the last margin collection and the close out of positions following a participant default. Initial margin should meet an established single-tailed confidence level of at least 99 percent for each product that is margined on a product basis, each spread within or between products for which portfolio margining is permitted, and for each clearing member's portfolio losses. The model should also be based on adequate time horizons for the close out of the particular types of products cleared by the CCP, have an appropriate method for measuring credit exposure that accounts for relevant product risk factors and portfolio effects across products, and, to the maximum extent practical and prudent, avoid the need for destabilising, procyclical changes.</p> <p>4. At least daily, a CCP should mark participant positions to market and collect variation margin to limit the build-up of current exposures. A CCP should have the authority and operational capacity to make intraday calls for initial and variation margin from participants with positions that have lost significant value.</p> <p>5. In calculating margin requirements, a CCP may allow offsets or reductions in required margin across products that it clears or between products that it and another CCP clear, if the price risk of one product is significantly and reliably correlated with the price risk of the other product. Where two or more CCPs are authorised to offer cross-margining, they must have appropriate safeguards and harmonise their overall risk-management programmes.</p> <p>6. A CCP should analyse and monitor its model performance and overall margin coverage by conducting rigorous daily backtesting and at least monthly, if not more frequent, stress testing. A CCP should regularly conduct an assessment of the theoretical and empirical properties of its margin model for all products it clears. A CCP, in reviewing its model's coverage, should take into account a range of scenarios, including scenarios that capture the most-volatile periods that have been experienced by the markets it serves and develop forward-looking scenarios to anticipate risks.</p> <p>7. A CCP should regularly review and validate its margin system.</p>				<ul style="list-style-type: none"> <li style="text-align: center;">• <li style="text-align: center;">• <li style="text-align: center;">• <li style="text-align: center;">• 	
Principle 7: Liquidity risk	•	•	•	•	
<p>1. An FMI should have a robust framework to manage its liquidity risks from its participants, settlement banks, nostro agents, custodian banks, liquidity providers, and other entities.</p> <p>2. An FMI should have effective operational and analytical tools to identify, measure, and monitor its settlement and funding flows on an ongoing and timely basis, including its use of intraday liquidity.</p>	<ul style="list-style-type: none"> <li style="text-align: center;">• <li style="text-align: center;">• 	<ul style="list-style-type: none"> <li style="text-align: center;">• <li style="text-align: center;">• 	<ul style="list-style-type: none"> <li style="text-align: center;">• <li style="text-align: center;">• 	<ul style="list-style-type: none"> <li style="text-align: center;">• <li style="text-align: center;">• 	

Key considerations	Payment systems	CSDs	SSSs	CCPs	TRs
<p>3. An FMI should maintain sufficient liquid resources (that is, liquid assets and prearranged funding arrangements) to effect same-day and, where appropriate, intraday settlement of payment obligations with a high degree of confidence under a wide range of potential stress scenarios that should include, but not be limited to, the default of the [one/two] participant[s] and [its/their] affiliates that would generate the largest aggregate liquidity need in extreme but plausible market conditions. A payment system, CSD, or SSS should have sufficient liquid resources to effect, at a minimum, timely completion of daily settlement in the event of the inability of the [one/two] participant[s] and [its/their] affiliates with the largest aggregate payment obligation[s] to settle those obligations. A CCP should have sufficient liquid resources to meet required margin payments and effect the same-day close out or hedging of the [one/two] participant[s] and [its/their] affiliates with the largest potential liquidity need[s] in extreme but plausible market conditions.</p>	•	•	•	•	
<p>4. An FMI should obtain a high degree of confidence through rigorous due diligence that each liquidity provider, whether or not it is a participant of the FMI, would have sufficient information to understand and to manage its associated liquidity risks, and that it has the capacity to perform as required under the liquidity arrangement. Where relevant to assessing a liquidity provider's performance reliability with respect to a particular currency, a liquidity provider's potential access to credit from the central bank of issue should be taken into account. An FMI should regularly test access to its liquid resources at a liquidity provider.</p>	•	•	•	•	
<p>5. For the purposes of this principle, liquid resources include cash at the central bank of issue and creditworthy commercial banks, as well as highly marketable collateral held in custody and investments that are readily available on a same-day basis and that are also convertible into cash with prearranged funding arrangements including committed liquidity lines, foreign exchange swaps, repos, or pledges. If an FMI has access to central bank credit, then an appropriate portion of its collateral holdings should be eligible for pledging to (or conducting other appropriate forms of transactions with) the relevant central bank. An FMI should not assume the availability of emergency central bank credit as a part of its liquidity plan.</p>	•	•	•	•	
<p>6. If an FMI has access to central bank accounts, payment services, or securities services, the FMI should use these services, where practical and available, to enhance its management of liquidity risk.</p>	•	•	•	•	
<p>7. An FMI should determine and test the sufficiency of its liquid resources by regular and rigorous stress testing. An FMI should have clear procedures to use the results of its stress test and to evaluate and adjust the adequacy of its liquidity risk-management framework. In conducting stress testing, an FMI should consider a wide range of relevant scenarios, including peak historic price volatilities, shifts in other market factors such as price determinants and yield curves, multiple defaults over various time horizons, simultaneous pressures in funding and asset markets, and a spectrum of forward-looking stress scenarios in a variety of extreme but plausible market conditions. Scenarios should also consider the design and operation of the FMI, and include all entities that might pose material liquidity risks to the FMI (such as settlement banks, nostro agents, custodian banks, liquidity providers, and linked FMIs). The stress-testing programme should include "reverse stress tests" aimed at identifying extreme market conditions for which the FMI's liquid resources would be insufficient.</p>	•	•	•	•	

Key considerations	Payment systems	CSDs	SSSs	CCPs	TRs
8. An FMI should have clear and transparent rules and procedures to address unforeseen and potentially uncovered liquidity shortfalls in order to avoid unwinding, revoking, or delaying the same-day settlement of payment obligations. An FMI's rules and procedures should also indicate its process to replenish any liquidity resources it may employ during a stress event, including the default of the two participants and their affiliates that would potentially cause the largest combined liquidity needs, so that it can continue to operate in a safe and sound manner.	•	•	•	•	
Principle 8: Settlement finality	•	•	•	•	
1. An FMI should clearly define the point at which the settlement of a payment, transfer instruction, or other obligation is irrevocable and unconditional.	•	•	•	•	
2. An FMI should complete final settlement no later than the end of the value date, and preferably intraday or in real time, to reduce settlement risk. An LVPS, CSD, or SSS should consider adopting RTGS or multiple-batch processing during the settlement day.	•	•	•	•	
3. An FMI should clearly define the point in time before settlement when unsettled payment or transfer instructions or obligations may not be revoked.	•	•	•	•	
Principle 9: Money settlements	•	•	•	•	
1. An FMI should conduct its money settlements in central bank money, where practical and available, to avoid credit and liquidity risks.	•	•	•	•	
2. If central bank money is not used, an FMI should conduct its money settlements using a settlement asset with little or no credit or liquidity risk.	•	•	•	•	
3. An FMI that settles in commercial bank money should establish and monitor adherence to strict criteria for its settlement banks that take account of, amongst other things, their supervision, creditworthiness, capitalisation, access to liquidity, and operational reliability.	•	•	•	•	
4. An FMI should closely control the credit and liquidity risks from its commercial settlement banks including the distribution of exposures among its commercial settlement banks.	•	•	•	•	
5. If an FMI conducts money settlements on its own books, it should minimise and strictly control its credit and liquidity risks.	•	•	•	•	
Principle 10: Physical deliveries		•	•	•	
1. An FMI's rules should clearly state its obligations with respect to the delivery of physical instruments or commodities.		•	•	•	
2. An FMI should identify, monitor, and manage the risks associated with the storage and delivery of physical instruments or commodities.		•	•	•	
Principle 11: Central securities depositories		•	•		
1. A CSD should have appropriate rules and procedures, including robust accounting practices and controls, to safeguard the interests of securities issuers and holders, prevent the unauthorised creation or deletion of securities, and conduct periodic reconciliation of securities issues it maintains.		•			
2. A CSD should prohibit overdrafts or debit balances in securities accounts.		•	•		

Key considerations	Payment systems	CSDs	SSSs	CCPs	TRs
<p>3. A CSD that maintains a link to another CSD should prohibit the provisional transfers of securities or, at a minimum, prohibit the retransfer of securities prior to the first transfer becoming final.</p> <p>4. A CSD should maintain securities in an immobilised or dematerialised form for their transfer by book entry. Where appropriate, a CSD should provide incentives to immobilise or dematerialise securities.</p> <p>5. A CSD should identify, measure, monitor, and manage its risks from other activities that it may perform; additional tools may be necessary in order to address these spillover effects.</p> <p>6. A CSD providing central safekeeping and settlement services to a CCP should ensure that the CCP would not pose additional material risks (such as liquidity and operational risk) as compared to any other participant in the CSD and, where necessary, take additional measures.</p>		<ul style="list-style-type: none"> • • • • 	<ul style="list-style-type: none"> • 		
Principle 12: Exchange-of-value settlement systems	•	•	•	•	
<p>1. An FMI that is an exchange-of-value settlement system should eliminate principal risk by linking the final settlement of one obligation to the final settlement of the other.</p> <p>2. The settlement of two obligations can be achieved in several ways and varies by how trades or obligations are settled, either on a gross basis (trade-by-trade) or on a net basis, and the timing of when finality occurs.</p>	<ul style="list-style-type: none"> • • 	<ul style="list-style-type: none"> • • 	<ul style="list-style-type: none"> • • 	<ul style="list-style-type: none"> • • 	
Principle 13: Participant-default rules and procedures	•	•	•	•	
<p>1. An FMI should have default rules and procedures that enable the FMI to continue to meet its obligations in the event of a participant default and that address the replenishment of resources following a default.</p> <p>2. An FMI should be well prepared to implement its default rules and procedures, including the exercise of any appropriate discretionary procedures provided in its rules.</p> <p>3. An FMI should make key aspects of its default rules and procedures available to the public.</p> <p>4. An FMI should engage with its participants and other relevant stakeholders in the periodic testing and review of its default procedures to ensure that they are practical and effective.</p>	<ul style="list-style-type: none"> • • • • 	<ul style="list-style-type: none"> • • • • 	<ul style="list-style-type: none"> • • • • 	<ul style="list-style-type: none"> • • • • 	
Principle 14: Segregation and portability				•	
<p>1. A CCP should have segregation and portability arrangements that protect customer positions and collateral to the greatest extent possible under applicable law, particularly in the event of a default or insolvency of a participant.</p> <p>2. A CCP should employ an account structure that enables it readily to identify and segregate positions and collateral belonging to customers of a participant. Such CCPs should maintain customer collateral and positions in an omnibus account or in individual accounts at the CCP or at its custodian.</p> <p>3. A CCP should structure its arrangements in a way that facilitates the transfer of the positions and collateral belonging to customers of a defaulting participant to one or more other participants.</p>				<ul style="list-style-type: none"> • • • 	

Key considerations	Payment systems	CSDs	SSSs	CCPs	TRs
4. A CCP should clearly disclose its rules, policies, and procedures relating to the segregation and portability of customer positions and collateral. In addition, a CCP should disclose any constraints, such as legal or operational constraints, that may impair its ability fully to segregate or port customer positions and collateral.				•	
Principle 15: General business risk	•	•	•	•	•
1. An FMI should have robust management and control systems to identify, monitor, and manage general business risks, including business strategy, cash flows, and operating expenses.	•	•	•	•	•
2. An FMI should hold sufficient equity or equity capital, in the form of shareholders' funds (such as common stock, disclosed reserves, or retained earnings), to cover potential general business losses, so that it can continue providing services as a going concern. Resources held to cover potential general business losses should be in addition to resources held to cover participant defaults or other risks covered under financial resource principles.	•	•	•	•	•
3. At a minimum, an FMI should hold equity capital at normal times equal to [six, nine, or twelve] months of expenses. An FMI may also need to hold additional equity capital, taking into account its general business risk profile. Capital held under international risk-based capital standards should be included where relevant and appropriate to avoid double regulation.	•	•	•	•	•
4. In addition to capital adequacy, an FMI's equity capital should reflect a strong cash, cash-equivalent, or securities position to allow the FMI to meet its current and projected operating expenses under a range of scenarios; cash equivalents and securities should consist of high-quality and sufficiently liquid assets that can easily be converted into cash at little or no loss of value, even in adverse market conditions.	•	•	•	•	•
5. An FMI should maintain a viable plan for (a) raising additional capital should its equity capital approach or fall below the minimum; and (b) if the FMI is unable to raise new capital, achieving an orderly wind down or reorganisation of its operations and services. This plan should be approved by the board of directors (or an appropriate board committee), updated regularly, and reviewed by the FMI's regulator, supervisor, or overseer.	•	•	•	•	•
Principle 16: Custody and investment risk	•	•	•	•	
1. An FMI should hold its assets, including assets that its participants have posted to it, at supervised and regulated entities that have robust accounting practices, safekeeping procedures, and internal controls that fully protect these assets.	•	•	•	•	
2. An FMI should have prompt access to its assets, including assets posted by participants, when required.	•	•	•	•	
3. An FMI's investment strategy should be consistent with its overall risk-management strategy, and investments should be secured by, or be claims on, high-quality obligors. These investments should allow for quick liquidation with little, if any, adverse price effect.	•	•	•	•	
Principle 17: Operational risk	•	•	•	•	•
1. An FMI should establish a robust operational risk-management framework with appropriate systems, policies, procedures, and controls to identify, monitor, and manage operational risks.	•	•	•	•	•

Key considerations	Payment systems	CSDs	SSSs	CCPs	TRs
2. The roles and responsibilities for operational risk should be clearly defined within the FMI, and the FMI's operational risk-management framework should be endorsed by the FMI's board of directors. Risks, operational policies and procedures, and systems should be reviewed, audited, and tested periodically and after significant changes.	•	•	•	•	•
3. An FMI should have clearly defined operational reliability objectives and should have policies in place that are commensurate with those objectives. An FMI should have adequate capacity and scalability, as well as the tools and procedures to monitor the performance of the FMI.	•	•	•	•	•
4. An FMI should have well-defined physical and information security policies. All potential vulnerabilities and threats should be investigated, assessed, and documented.	•	•	•	•	•
5. An FMI should have a business continuity plan that addresses events posing a significant risk of disrupting operations, including events that could cause a wide-scale disruption. The plan should incorporate the use of a secondary site and should ensure that critical information technology (IT) systems can resume operations within two hours following disruptive events. In case of extreme circumstances, settlement should be ensured by the end of the day at the latest. The FMI should plan and carry out a programme of tests of these arrangements.	•	•	•	•	•
6. An FMI should identify, monitor, and manage the risks that key participants, other FMIs, and service and utility providers might pose to its operations. In addition, an FMI should identify, monitor, and manage the risks its operations might pose to other FMIs.	•	•	•	•	•
Principle 18: Access and participation requirements	•	•	•	•	•
1. An FMI should allow for fair and open access to its services, including by direct and, where relevant, indirect participants and other FMIs, based on reasonable risk-related participation requirements.	•	•	•	•	•
2. Any restrictions in an FMI's participation requirements should be justified in terms of the safety and efficiency to the FMI and the markets it serves, be tailored to its specific risks, and be publicly disclosed.	•	•	•	•	•
3. An FMI should monitor compliance with its participation requirements on an ongoing basis, and have clear procedures for facilitating the suspension and orderly exit of a participant that breaches, or no longer meets, the participation requirements.	•	•	•	•	•
Principle 19: Tiered participation arrangements	•	•	•	•	•
1. An FMI should, to the extent practicable, identify, understand, and manage its potential risks arising from such tiered participation arrangements. The risks identified and the proposed mitigating actions should be reported to the FMI's board of directors.	•	•	•	•	•
2. An FMI should ensure that its rules and agreements with direct participants allow it to gather basic information about indirect participation and to identify, monitor, and manage relevant concentrations of risk and important interdependencies. As far as possible, an FMI should seek to identify direct participants acting on behalf of a material number of indirect participants, indirect participants with significant daily turnover in the system, those that are larger than the direct participants through which they access the FMI, or that pose other specific risks.	•	•	•	•	•

Key considerations	Payment systems	CSDs	SSSs	CCPs	TRs
3. If an FMI identifies material risks arising from tiered participation arrangements, it should periodically review the system rules and procedures with its board to determine whether there are potential issues related to indirect participation in terms of legal structure, finality, or the stable operation of the system, and ensure that the nature of each user's participation is clearly defined.	•	•	•	•	•
Principle 20: FMI Links		•	•	•	•
<p>1. Before entering into a link arrangement and on an ongoing basis once the link is established, an FMI should identify and assess all potential sources of risk arising from the link arrangement. Link arrangements should be designed such that each FMI is able to observe the other principles in this report.</p> <p>2. A link should have a well-founded legal basis, in the relevant jurisdictions, that supports its design and provides adequate protection to the FMIs in the operation of the link.</p> <p>3. Linked CSDs should measure, monitor, and manage their credit and liquidity risks arising from each other. Any credit extensions between CSDs should be covered fully with high-quality collateral and be subject to limits.</p> <p>4. Provisional transfers of securities between linked CSDs should be prohibited or, at a minimum, the retransfer of provisional transferred securities should be prohibited prior to the transfer becoming final.</p> <p>5. An investor CSD should only establish a link with an issuer CSD if the arrangement provides a high level of protection for the rights of the investor CSD's participants.</p> <p>6. An investor CSD that uses an intermediary to operate a link with an issuer CSD should measure, monitor, and manage the additional risks (including custody, credit, and operational risks) arising from the use of an intermediary.</p> <p>7. Before entering into a link with another CCP, a CCP should identify and assess the potential spillover effects of the linked CCP's default and assess its ability to cope with such occurrence. If a link has three or more CCPs, each CCP should identify, assess, and manage the risks of the collective links arrangement.</p> <p>8. The inter-CCP risk management for the provision and holding of financial resources should enable each CCP to cover at least on a daily basis its current exposures fully and its potential future exposure with a high degree of confidence, without reducing the CCP's ability to fulfil its own obligations at any time.</p> <p>9. A TR should carefully assess the additional operational risks related to its links to ensure the scalability and reliability of IT and related resources.</p>		•	•	•	•
Principle 21: Efficiency and effectiveness	•	•	•	•	•
<p>1. An FMI should be designed to meet the needs of its participants and the markets it serves, in particular, with regard to choice of a clearing and settlement scheme; operating structure; scope of products recorded, cleared, or settled; and use of technology and procedure.</p> <p>2. An FMI should have clearly defined goals and objectives that are measurable and achievable, such as in the areas of minimum service levels, risk-management expectations, and business priorities.</p>	•	•	•	•	•

Key considerations	Payment systems	CSDs	SSSs	CCPs	TRs
3. An FMI should have established mechanisms for the regular review of its efficiency and effectiveness.	•	•	•	•	•
Principle 22: Communication procedures and standards	•	•	•	•	•
1. An FMI should use, or at a minimum accommodate the use of, internationally accepted communication procedures that can support interoperability between the FMI, its participants, their customers, and other users (such as third-party service providers and other FMIs).	•	•	•	•	•
2. An FMI should use, or at a minimum accommodate, internationally accepted communication standards, such as standardised messaging formats and reference data standards for identifying financial instruments and counterparties.	•	•	•	•	•
3. An FMI that operates across borders should use, or at a minimum accommodate, internationally accepted communication procedures and standards.	•	•	•	•	•
Principle 23: Disclosure of rules and key procedures	•	•	•	•	•
1. An FMI should adopt clear and comprehensive rules and procedures that are fully disclosed to participants and relevant rules and key procedures should be publicly disclosed.	•	•	•	•	•
2. An FMI should disclose clear descriptions of the system's design and operations, as well as the rights, obligations, and risks participants incur by participating in the FMI.	•	•	•	•	•
3. An FMI should provide all necessary and appropriate documentation and training to facilitate participants' understanding of the FMI's rules and procedures and the risks they face from participating in the FMI.	•	•	•	•	•
4. An FMI should publicly disclose its fees at the level of individual services it offers, as well as its policies on any available discounts. The FMI should provide clear descriptions of priced services for comparability purposes.	•	•	•	•	•
Principle 24: Disclosure of market data					•
1. A TR should provide data in line with regulatory and industry expectations to relevant authorities and the public, respectively, that is comprehensive and at a level of detail sufficient to enhance market transparency and support other public policy objectives.					•
2. A TR should have effective processes and procedures to provide data to relevant authorities in a timely and appropriate manner to enable them to meet their respective regulatory mandates and legal responsibilities.					•
3. A TR should have robust information systems that provide accurate current and historical data. Data should be provided in a timely manner and in a format that permits it to be easily analysed.					•

Annex E: Guidance for CCPs that clear OTC derivatives

This annex provides guidance to CCPs that clear OTC derivatives. Part 1 of the annex identifies key features of OTC derivatives that distinguish them from exchange-traded products, and part 2 provides guidance to CCP's regarding their ability to take extraordinary emergency actions.

Part 1: Distinctive features of OTC derivatives

While OTC derivatives products share many characteristics with listed derivatives products, there are certain features that differentiate them. Because of these differences, OTC derivatives products present more challenges to a CCP's ability to clear them in a safe and efficient manner when compared to clearing listed derivatives products, which leads to the need for tailored guidance for OTC derivatives CCPs.

The differences between these products arise at least in part from differences in market structure. Listed products often trade on exchanges, which are more centralised and deterministic with respect to trading liquidity provision, price formation and discovery, and matching of participants' trading interests. These features contribute to greater market transparency. Historically, standardised and fungible products have been traded on exchanges. In contrast, OTC markets are decentralised and allow greater discretion to the market participants in customising contractual terms, providing market liquidity (for example, quoting prices) and executing transactions. As such, OTC derivatives markets are typically characterised by information asymmetries and less market transparency overall. Because the successful operation of CCPs depends critically on timely information flows from markets and robust trading liquidity in the markets, the decentralised structure of OTC derivatives markets presents several distinctive challenges to CCPs:

- (a) *Products suitable for clearing:* In general, all products listed on an exchange are centrally cleared. They are highly standardised and fungible. On the other hand, OTC markets allow for individual negotiation, which permits flexible development of products. As such, the population of OTC derivatives products suitable for clearing will not be constant, as market participants continuously develop products or as the level of liquidity in products changes over time. The benefits of reducing aggregate counterparty risk by clearing as wide a spectrum of OTC derivatives products as possible will vary with the ability of CCPs to manage associated risks effectively.
- (b) *Submission of transactions for clearing:* Listed markets consist of organised exchanges or other trading platforms that, in many cases, have been developed in parallel, and remain affiliated and/or closely integrated, with an underlying CCP. OTC derivatives markets that adopt centralised clearing models must often develop new platforms and processes in order to connect the trading environment to the CCP.¹⁴⁷ Furthermore, such platforms and processes may or may not be affiliated with the CCP. Finally, there are multiple electronic trading venues for OTC derivatives markets that are in various stages of development. Such conditions result in trading environments less closely integrated with the CCP and may therefore cause concerns with regard to processing efficiency, operational reliability, interoperability, and open access.
- (c) *Risk-management tools commensurate with OTC derivatives markets' risks:* The bilateral nature of transactions executed in OTC derivatives markets allows for increased customisation of contracts, typically resulting in greater complexity as well as reduced

¹⁴⁷ Some OTC derivatives markets are presently served by CCPs that are affiliated with organised exchanges but convert OTC derivatives products to "OTC look-alike" transactions.

fungibility and trading liquidity than those in listed markets. This in turn affects CCPs' ability to manage associated risks appropriately. In addition to typical risk-management tools used by CCPs in listed markets, CCPs in OTC derivatives markets may employ other risk-management processes designed for the unique risks of the cleared OTC derivatives product. Participant requirements, margin requirements, financial resources and default procedures are particular areas where a CCP may need to consider additional tools tailored for OTC derivatives markets.

- (d) *Pricing sources for risk management*: In order to appropriately measure and manage risk and calculate margins, a CCP must have access to reliable consensus pricing sources. While listed markets generally provide prices based on a centralised order book, OTC derivatives markets are quote-driven and therefore require separate services that aggregate quoted prices from multiple market participants (for example, major dealers) and calculate composite consensus prices. Unless an OTC derivatives CCP performs this function itself, it relies critically on arrangements with service providers (see (e) below).
- (e) *Interaction with other post-trade infrastructures*: Some OTC derivatives markets have developed supporting market infrastructures around OTC derivatives CCPs to address specific needs that do not apply in listed markets, such as TRs, pricing data services and portfolio compression services. Such services may be essential for the efficient operations and effective risk management of OTC derivatives markets and will interact closely with CCPs serving those markets.
- (f) *Scope of participants and markets*: Reflecting the global nature of the OTC derivatives markets, some OTC derivatives CCPs are likely to become more international in terms of products (for example, reference assets, and denominations of currency), participants and operations than CCPs for listed products. As the international regulatory community promotes greater use of CCPs for OTC derivatives markets, a growing number of market participants are likely to seek access to OTC derivatives CCPs abroad especially if there are no feasible domestic alternatives. OTC derivatives clearing may involve a number of OTC derivatives CCPs and third-party service providers located in different jurisdictions or even different regions of the world. In addition, participants in OTC derivatives CCPs may be less homogeneous than participants in CCPs for listed products, given the potential for greater direct or indirect participation by buy-side firms promoted by the international regulatory community.¹⁴⁸ Therefore, an OTC derivatives CCP may need to pay close attention to cross-border aspects of legal and operational arrangements. It also may need to consider the use of bespoke participation requirements, the segregation and portability of indirect participants' positions and margins, and how it can incorporate these varied participants into its governance structure. There will also be greater need for close cross-border cooperation among relevant authorities.
- (g) *Governance reflective of the OTC derivatives market*: Relationships among the participants in OTC derivatives markets have historically been determined by bilateral agreements, industry practices, and market conventions, while participants in listed markets are bound by the rules set by trading venues and affiliated clearinghouses. An OTC derivatives CCP must consider in its governance process the appropriate rules and management of the risks it takes on, its role in the market as a source of stability, as well as conventions, standards and protocols widely adopted by market participants.

¹⁴⁸ Prior to the onset of the financial crisis, OTC derivatives markets were broadly characterised by decentralised and often tiered arrangements for clearing and settlements. In particular, there was a growing use of prime brokerage arrangements, in which a limited number of major dealer firms acted as a prime broker, intermediating a large number of transactions between buy-side firms (for example, hedge funds) and executing dealers.

- (h) *Market transparency*: The decentralised structure of OTC derivatives markets and the still-developing state of trading infrastructure have also been less conducive to market transparency. Relevant authorities and the public need to have a comprehensive view of the market information in a timely manner. Relevant authorities have the need to identify and evaluate the potential risks posed by OTC derivative markets to the broader financial system. They also have the need to strengthen the ability to monitor risks of individual market participants and market practices. In OTC derivatives markets, there have been historically no centralised sources of information that are comparable with organised exchanges in listed markets. As a result, OTC derivatives CCPs have recently been looked upon as potential alternative sources of comprehensive data available to the public and relevant authorities in line with their respective information needs.

Part 2: Detailed guidance on CCP emergency actions and market protocols

Introduction

This part of the annex provides guidance regarding a CCP's ability to take extraordinary emergency actions and the role of industry standards and market protocols. Extraordinary emergency situations are those which have not been anticipated by and accordingly may not be adequately resolved through the established procedures outlined by CCPs. Thus, the situation can only be addressed by CCPs taking unanticipated emergency action. Based on this definition, invoking procedures to address a participant default on its own, for example, are not considered part of emergency actions as CCPs should have well established procedures in place to address such circumstances. Specifically, this part of the annex discusses guidance with regard to:

- The appropriate scope of CCPs' ability to take extraordinary emergency actions;
- The appropriate CCP governance process in emergency circumstances;
- The expectations for CCPs to limit the economic impact of emergency actions; and
- CCPs' role in developing and adhering to industry standards and market protocols.

Analysis and regulatory guidance

1. The appropriate scope of CCPs' ability to take extraordinary emergency actions

A CCP should have the ability to make independent decisions to appropriately manage its risks, safeguard against its insolvency and have the flexibility to take necessary action in extreme and unanticipated situations. The ability of a CCP to take emergency action, and any such action taken, should be balanced with the CCP's responsibility to support risk reduction and market integrity, especially in a stressed financial environment. CCPs should seek, in considering when and how emergency powers may be exercised, to minimise uncertainty for their participants and instability in the wider market.

It is a common practice for CCPs to have the ability to invoke, in extreme situations, emergency powers that temporarily provide relief to the CCP of obligations to perform on a contract or to compensate participants for losses incurred from the failure to perform. Such invocation of emergency powers usually includes circumstances beyond the CCP's reasonable control such as force majeure situations, physical emergencies and extraordinary market events (for example, complete and prolonged failure of price discovery mechanisms in the market) that fall outside of the scope of CCPs' established procedures and may impair the orderly operations of a CCP. This is in contrast to taking actions to mitigate credit concerns or manage economic outcomes in times of financial stress, which should be managed as part of the CCP's regular risk-management processes.

Principle 23 on disclosure of rules and key procedures requires an FMI to provide market participants with sufficient information for them to accurately understand the risks they incur by participating in the FMI. Accordingly, a CCP's rules should broadly specify the range of circumstances when the CCP has the ability to invoke emergency powers so that its participants can understand and manage the risk associated with their participation in the CCP and their contingent liabilities vis-à-vis the CCP. If and when such powers are used, efforts should be taken by the CCP to minimise any economic impact on affected parties (see section 3).

An emergency action should not be undertaken lightly, and it should be limited to extraordinary situations in which there is significant risk that failure to take action would result in the failure of the CCP.¹⁴⁹ It would not be acceptable for CCPs to take emergency actions and alter established processes for commercial reasons, to avoid operational burdens that are possible to manage and without following due process. Furthermore, CCPs should not take emergency actions that, as far as can be judged with available information, would result in a greater level of uncertainty or systemic risk to the financial system. In addition, the CCP should ensure that all possible alternatives compatible with its established procedures have been investigated before considering any form of emergency actions and ensure that the action being promoted is appropriate and proportionate.

A CCP must ensure that any exercise of emergency powers does not lead it acting in a manner that is inconsistent with regulatory standards, such as the *Principles for FMIs*, or which alters the CCP's risk-management framework that received regulatory approval(s) (unless the regulator(s) have had sight of and given approval for the changes in question) and on which the CCP's participants' expectations of the CCP's relative loss mutualisation will be based.

The exercise of emergency power should not have the effect that any or all of the trades or positions cleared by the CCP revert to bilateral exposures, without the prior consent of the affected participants.

The exercise of emergency action should not allow a CCP to void or refuse to perform on previously cleared contracts because market events or industry protocols/decisions have made the managing of the associated risk exposures difficult, either commercially or operationally, for the CCP.

In general, actions that would undermine the primary purpose of a CCP to act as principal to the transactions it supports, centrally manage credit risk in the market, and serve as a source of market strength and stability would not be acceptable.

2. *The appropriate CCP governance process in emergency circumstances*

Governance best practices would expect that a CCP have a well established decision-making process through its board, appropriate board committees and management. If, due to exigent circumstances, the members of the board or other relevant board committees are not available to guide the decision to invoke extraordinary emergency powers, the CCP's management should be required to review, as soon as is practical, such decisions with the board ex post.

¹⁴⁹ As noted above, invoking emergency actions in circumstances that would impair the orderly operations of the CCP and which cannot be effectively managed within the CCP's established procedures are acceptable, but in the case of other types of problems (for example, due to credit concerns or to manage economic outcomes) that should be managed as part of the CCP's regular risk management processes, the higher systemic risk criteria (that is, clear risk of potential failure of the CCP should emergency action not be taken) should be considered.

The CCP should recognise that an independent emergency action taken by a CCP may have adverse economic consequences for market participants and that there may be potential conflicts of interest among the CCP's owners, its operators, its participants and the broader market when making such decisions. There should be a predefined policy and procedures for identifying and managing the potential conflicts of interest, engaging the CCP's participants and other stakeholders, including its regulators, as appropriate, and considering the impact of the CCP's actions on the stability of the market more broadly.¹⁵⁰

The CCP's process should also include its communication plans once a decision has been made to ensure that its participants and regulators receive information about the decision in a timely manner and understand its implications.

3. *The expectations for CCPs to minimise the economic impact of emergency actions*

By its nature as a principal to the transactions it supports, a CCP must meet its obligations to its participants under all market conditions including instances of market stress and participant default. The manner in which a CCP meets its obligations and helps preserve market integrity is vitally important irrespective of how many CCPs serve the relevant market(s).

In principle, a CCP's use of emergency powers should have an economically neutral effect on its participants, or, if that is not possible, should minimise the economic impact on participants and maintain the relative mutualisation of risk that its participants expect from the rules. Therefore, economic consequences that result from the use of emergency powers should be mitigated to preserve the economic terms of the affected trades and the original rules to the fullest practical extent. Since CCPs must maintain balanced positions and be profit neutral, they should mandate or otherwise mediate the transfer of any windfall directly acquired as a result of their decision from the beneficiaries to the losers of the decision.

4. *CCPs' role in developing and adhering to industry standards and market protocols*

In certain markets, CCPs should consider adoption and adherence to formally stated and/or contractual industry standards and market protocols that have been established.¹⁵¹ CCPs adopting such formalised standards should specify in its legal documentation how these standards and protocols interact with or are included in the CCP's established rules and procedures. Development of such industry standards and market protocols increase certainty, transparency and stability in the market. Divergent practices by CCPs and individual market participants could undermine the market's efforts to develop processes to govern and reduce uncertainty.

As participants in a particular market, CCPs are expected to adhere to any practices or arrangements that have become established as market conventions (although such conventions may not be formalised) and/or act in a manner that does not conflict with such

¹⁵⁰ While the CCP's decision-making process is independent, the CCP's regulator(s) may have broader market perspectives that the CCP should evaluate and consider, particularly in stressed market conditions. Such communication and coordination is especially important in circumstances where a CCP's decision may have systemic risk implications or when systemic risk concerns may guide a CCP's need to use its emergency powers. Under such scenarios, it is important that a CCP does not make any critical decisions in isolation that could result in the CCP contributing to destabilising the market during an already stressed time. Further, the informed regulator(s) can keep the broader regulatory community apprised of relevant developments at the CCP, as appropriate. This will allow for any needed regulatory coordination and help promote consistent approaches.

¹⁵¹ For example, in the OTC derivatives market there are protocols related to the novation of contracts among counterparties, credit event auctions and restructurings, and close-out methodologies in the event of a counterparty's default. See ISDA website (<http://www.isda.org/protocol/index.html>).

terms, unless the CCP has reasonable grounds not to do so that do not conflict with the markets' wider interest.

CCPs must have governance arrangements that give due consideration to market protocols. The arrangements adopted by a CCP should be transparent to its participants and regulators.

In addition, where CCPs support a market and are expected to fully adhere to marketwide protocols and related decisions, CCPs should be involved in the development and establishment of such standards. It is critical that market governance processes fully reflect the role of CCPs in the market.¹⁵²

¹⁵² For example, in the OTC credit derivatives market, as CCPs develop to clear a greater share of the market, the CCPs are expected to participate more actively in the relevant ISDA Credit Derivatives Determination Committee for credit events and adhere to the decisions of the Determination Committee.

Annex F: Oversight expectations applicable to critical service providers

The operational reliability of an FMI may be dependent on the continuous and adequate functioning of service providers that are critical to an FMI's operations, such as information technology and messaging providers. A regulator, supervisor, or overseer of an FMI may want to establish expectations for an FMI's critical service providers in order to support an FMI's overall safety and efficiency. The expectations should help ensure the operations of a critical service provider are held to the same standards as if the FMI provided the service. The expectations outlined below are specifically targeted at critical service providers and cover risk identification and management, robust information security management, reliability and resilience, effective technology planning, and strong communications with users. These expectations are written at a broad level, allowing critical service providers flexibility in demonstrating that they meet the expectations.

1. Risk identification and management

A critical service provider is expected to identify and manage relevant operational and financial risks to its critical services and ensure that its risk-management processes are effective.

A critical service provider should have effective processes and systems for identifying and documenting risks, implementing controls to manage risks, and making decisions to accept certain risks. A critical service provider may face risks related to information security, reliability and resilience, and technology planning, as well as legal and regulatory requirements pertaining to its corporate organisation and conduct, relationships with customers, strategic decisions that affect its ability to operate as an ongoing concern, and dependencies on third parties. A critical service provider should re-assess its risks, as well as the adequacy of its risk-management framework in addressing the identified risks, on an ongoing basis.

The identification and management of risks should be overseen by a critical service provider's board of directors (board) and assessed by an independent, internal audit function that can communicate clearly its assessments to relevant board members. The board is expected to ensure an independent and professional internal audit function. The internal audit function should be reviewed to ensure it adheres to the principles of a professional organisation that governs audit practice and behaviour (such as the Institute of Internal Auditors), and is able to independently assess inherent risks as well as the design and effectiveness of risk-management processes and internal controls. The internal audit function should also ensure that its assessments are communicated clearly to relevant board members.

2. Information Security

A critical service provider is expected to implement and maintain appropriate policies and procedures, and devote sufficient resources to ensure the confidentiality and integrity of information and the availability of its critical services in order to fulfil the terms of its relationship with an FMI.

A critical service provider should have a robust information security framework that appropriately manages its information security risks. The framework should include sound policies and procedures to protect information from unauthorised disclosure, ensure data integrity, and guarantee the availability of its services. In addition, a critical service provider should have policies and procedures for monitoring its compliance with its information security framework. This framework should also include capacity planning policies and change-management practices. For example, a critical service provider that plans to change

its operations should assess the implications of such a change on its information security arrangements.

3. Reliability and resilience

A critical service provider is expected to implement appropriate policies and procedures, and devote sufficient resources to ensure that its critical services are available, reliable, and resilient. Its business continuity management and disaster recovery plans should therefore support the timely resumption of its critical services in the event of an outage so that the service provided fulfils the terms of its agreement with an FMI.

A critical service provider should ensure that it provides reliable and resilient operations to users, whether these operations are provided to an FMI directly or to both an FMI and its participants. A critical service provider should have robust operations that meet or exceed the needs of the FMI. Any operational incidents should be recorded and reported to the FMI and the FMI's regulator, supervisor, or overseer. Incidents should be analysed promptly by the critical service provider in order to prevent recurrences that could have greater implications. In addition, a critical service provider should have robust business continuity and disaster recovery objectives and plans. These plans should include routine business continuity testing and a review of these test results to assess the risk of a major operational disruption.

4. Technology planning

The critical provider is expected to have in place robust methods to plan for the entire lifecycle of the use of technologies and the selection of technological standards.

A critical service provider should have effective technology planning, which reduces overall operational risk and enhances operational performance. Planning entails a comprehensive information technology strategy that considers the entire lifecycle for the use of technologies and a process for selecting standards when deploying and managing a service. Proposed changes to a critical service provider's technology should entail a thorough and comprehensive consultation with the FMI and, where relevant, its participants. A critical service provider should regularly review its technology plans, including assessments of its technologies and the processes it uses for implementing change.

5. Communication with users

A critical service provider is expected to be transparent to its users and provide them sufficient information to enable users to understand clearly their roles and responsibilities in managing risks related to their use of a critical service provider.

A critical service provider should have effective customer communication procedures and processes. In particular, a critical service provider should provide the FMI and, where appropriate, its participants with sufficient information so that users clearly understand their roles and responsibilities, enabling them to manage adequately their risks related to their use of the services provided. Useful information for users typically includes, but is not limited to, information concerning the critical service provider's management processes, controls, and independent reviews of the effectiveness of these processes and controls. As a part of its communication procedures and processes, a critical service provider should have mechanisms to consult with users and the broader market on any technical changes to its operations that may affect its risk profile, including incidences of absent or non-performing risk controls of services. In addition, a critical service provider should have a crisis communication plan to handle operational disruptions to its services.

Annex G: Bibliography

- BCBS, *The application of Basel II to trading activities and the treatment of double default effects*, April 2005.
- BCBS, *International convergence of capital measurement and capital standards*, June 2006.
- BCBS, *Principles for sound stress testing practices and supervision*, May 2009.
- BCBS, *Sound practices for backtesting counterparty credit risk models - consultative document*, April 2010.
- CGFS, *Implications of repo markets for central banks*, 1999.
- CGFS, *The role of margin requirements and haircuts in procyclicality*, March 2010.
- CPSS, *Central bank oversight of payment and settlement systems*, May 2005.
- CPSS, *Core principles for systemically important payment systems*, January 2001.
- CPSS, *Delivery versus payment in securities settlement systems*, September 1992.
- CPSS, *The interdependencies of payment and settlement systems*, June 2008.
- CPSS, *Market structure developments in the clearing industry: implications for financial stability*, September 2010.
- CPSS, *Report of the Committee on Interbank Netting Schemes of the central banks of the Group of Ten countries*, November 1990.
- CPSS, *Strengthening repo clearing and settlement arrangements*, September 2010.
- CPSS-IOSCO, *Assessment methodology for 'Recommendations for securities settlement systems'*, November 2002.
- CPSS-IOSCO, *Considerations for trade repositories in OTC derivatives*, May 2010.
- CPSS-IOSCO, *Guidance on the application of 2004 CPSS-IOSCO recommendations for central counterparties to OTC derivatives CCPs*, May 2010.
- CPSS-IOSCO, *Recommendations for central counterparties*, November 2004.
- CPSS-IOSCO, *Recommendations for securities settlement systems*, November 2001.
- CPSS-IOSCO, *Securities lending transactions: market development and implications*, 1999.
- Financial Stability Board, *Implementing OTC derivatives market reforms*, October 2010.
- Financial Stability Forum, *FSF principles for sound compensation practices*, April 2009.
- IOSCO, *Objectives and principles of securities regulation*, October 2003.
- IOSCO, *Principles regarding cross-border supervisory cooperation*, May 2010.

Annex H: Glossary

The following terms were defined in this report. For general definitions of other terms not defined in this report, please see CPSS, *A glossary of terms used in payments and settlement systems*, March 2003, and European Central Bank and Eurosystem, *Glossary of terms related to payment, clearing, and settlement systems*, December 2009.

Term	Definition	Para no
backtesting	Backtesting involves comparing observed outcomes derived by a model (using actual historical data, that is, what actually occurred) against forecasted outcomes.	3.4.11.
central counterparty	An entity that interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer and thereby ensuring the performance of open contracts.	1.13.
central securities depository	An entity that holds securities accounts and, in many countries, operates a securities settlement. A CSD also provides central safekeeping and asset services, which may include the administration of corporate actions and redemptions, and plays an important role in helping to ensure the integrity of securities issues (that is, securities are not accidentally or fraudulently created or destroyed or their details changed).	1.11.
credit risk	The risk that a counterparty, whether a participant or other entity, will be unable to meet fully its financial obligations when due, or at any time in the future.	2.5.
current exposure	The loss that an FMI or its participants would immediately face if a participant defaulted. Current exposure is technically defined as the larger of zero or the market value (or replacement cost) of a transaction or portfolio of transactions within a netting set with a counterparty that would be lost upon the default of the counterparty.	3.4.1.
custody risk	The risk of loss on assets held in custody in the event of a custodian's (or subcustodian's) insolvency, negligence, fraud, poor administration, or inadequate recordkeeping.	2.8.
delivery versus delivery	A securities settlement mechanism that links two securities transfers in such a way as to ensure that delivery of one security occurs if and only if the corresponding delivery of the other security occurs.	3.12.2.
delivery versus payment	A securities settlement mechanism that links a securities transfer and a funds transfer in such a way as to ensure that delivery occurs if and only if the corresponding payment occurs.	3.12.2.
dematerialisation	Dematerialisation involves the elimination of physical certificates or documents of title that represent ownership of securities so that securities exist only as accounting records.	3.11.4.

financial market infrastructure	A multilateral system among participating financial institutions, including the operator of the system, used for the purposes of recording, clearing, or settling payments, securities, derivatives, or other financial transactions.	1.8.
final settlement	The irrevocable and unconditional transfer of an asset or financial instrument or the discharge of an obligation by the FMI or its participants in accordance with the terms of the underlying contract.	3.8.1.
general business risk	General business risk refers to any potential impairment of the financial position (as a business concern) of an FMI as a consequence of a decline in its revenues or growth in its expenses, such that expenses exceed revenues and result in a loss that must be charged against capital.	3.15.1.
governance	The set of relationships between an FMI's owners, board of directors, management, and other interested parties, including participants, authorities, and other stakeholders (such as indirect participants, participants' customers, other interdependent FMIs, and the wider market).	3.2.2.
immobilisation	Immobilisation involves concentrating the location of securities in a depository and transferring ownership by book entry.	3.11.4.
initial margin	Margin that is collected to cover potential changes in the value of each participant's position over the appropriate close-out period in the event the participant defaults.	3.6.1.
investment risk	Investment risk is the risk of loss when an FMI invests its own resources, or resources such as collateral posted by its participants, in instruments with market, credit, or liquidity risks.	2.8.
large-value payment system	A funds transfer system that typically handles large-value and high-priority payments.	1.10.
legal risk	The risk of the unexpected application of a law or regulation, usually resulting in a loss.	2.4.
liquidity risk	The risk that a counterparty, whether a participant or other entity, will have insufficient funds to meet its financial obligations as and when expected, although it may be able to do so in the future.	2.6.
novation	A legal concept where the original contract between a buyer and a seller is discharged and a central counterparty is substituted between the parties as seller to the buyer and buyer to the seller, creating two new contracts.	3.1.8.
operational risk	The risk that deficiencies in information systems or internal processes, human errors, management failures, or disruptions from external events will result in the reduction, deterioration, or breakdown of services provided by an FMI.	2.9.

payment system	A set of instruments, procedures, and rules for the transfer of funds between or among participants; the system includes the participants and the entity operating the arrangement.	1.10.
payment versus payment	A settlement mechanism that ensures that the final transfer of a payment in one currency occurs if and only if the final transfer of a payment in another currency or currencies takes place.	3.12.2.
physical delivery	The delivery of an instrument or asset in physical form.	3.10.2.
portability	Refers to the operational aspects of the transfer of contractual positions, funds, or securities from one party to another party by means of a conveyance of money or financial instruments.	3.14.2.
potential future exposure	Any potential credit exposure that an FMI could face at a future date (such as the additional exposure that an FMI might potentially assume during the life of a contract or set of contracts beyond the current replacement cost).	3.4.1.
principal risk	The risk that a counterparty will lose the full value involved in a transaction, for example, the risk that a seller of a financial asset will irrevocably deliver the asset, but not receive payment.	2.5.
procyclicality	Refers to changes in risk-management practices that are positively correlated with business or credit cycle fluctuations and that may cause or exacerbate financial instability.	3.5.5.
retail payment system	A funds transfer system that typically handles a large volume of relatively low-value payments in such forms as cheques, credit transfers, direct debits, and debit card transactions.	1.10.
securities registrar	An entity that provides the service of preparing and recording accurate, current, and complete securities registers for securities issuers.	1.11.
securities settlement system	A system that enables securities to be transferred and settled by book entry according to a set of predetermined multilateral rules. Such systems allow transfers of securities either free of payment or against payment.	1.12.
segregation	A method of protecting customer collateral and contractual positions by holding or accounting for them separately from those of the direct participant (such as a carrying firm or broker).	3.14.1.
straight-through processing	Automation of processing that allows data to be entered into technical systems only once and then used for all subsequent transaction processing.	3.23.3.
systemic risk	The risk that the inability of one or more participants to perform as expected will cause other participants to be unable to meet their obligations when due.	2.2.
trade repository	A central entity that maintains an electronic record (database) of transaction data	1.14.

value date	The day on which an obligation is due and available to a receiving participant.	3.8.1.
variation margin	Margin that is collected and typically paid out to reflect current exposures resulting from actual changes in market prices.	3.6.1.
wrong-way risk	The risk that an exposure to a counterparty is likely to increase when the creditworthiness of that counterparty is deteriorating.	3.5.2.