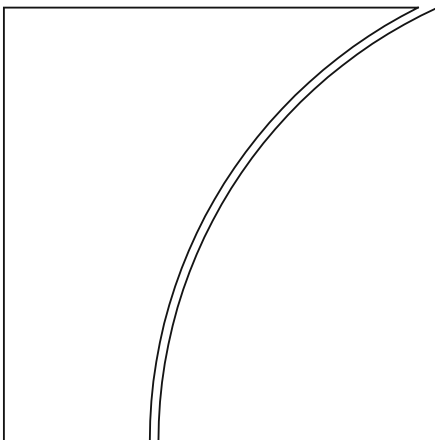
Committee on Payment and Settlement Systems

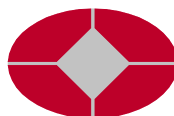
Board of the International Organization of Securities Commissions

Consultative report



Recovery of financial market infrastructures

August 2013


BANK FOR INTERNATIONAL SETTLEMENTS

OICU-IOSCO

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This report is being issued now for public consultation. Comments should be sent by 11 October 2013 to both the CPSS secretariat (cpss@bis.org) and the IOSCO secretariat (fmirecovery@iosco.org). The comments will be published on the websites of the BIS and IOSCO unless commentators have requested otherwise.

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

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Executive summary

The purpose of this report is to provide guidance to financial market infrastructures (FMIs) on the development of recovery plans. All systemically important FMIs should have comprehensive and effective recovery plans because the disorderly failure of such FMIs could lead to severe systemic disruptions. This report is not intended to create additional standards for FMIs, or authorities, beyond those set out in the CPSS-IOSCO *Principles for financial market infrastructures* (PFMI) but, rather, to provide supplemental guidance on, and a menu of tools for, observance of the PFMI. Moreover, tools may be used in different combinations or sequences by different FMIs. The report is also intended to be consistent with the FSB's *Key attributes of effective resolution regimes for financial institutions* (the *Key attributes*). This report provides guidance on the recovery planning process and content of recovery plans. It sets forth an overview of some of the tools that FMIs may include in their recovery plans, including a discussion of scenarios that may trigger the use of recovery tools and a framework for evaluating recovery tools in the context of such scenarios.

This report considers recovery tools that fall into five categories: tools to allocate uncovered losses caused by member default; tools to address uncovered liquidity shortfalls; tools to replenish financial resources; tools to allocate losses not related to participant default; and tools for CCPs to re-establish a matched book. For each recovery tool, guidance is provided on the elements that an FMI should consider in its recovery plan and on the tool's likely effects. An FMI may have or seek to design additional or alternative tools so that it is able to continue to provide its critical services.

FMIs should have a set of recovery tools that is comprehensive and effective in allowing the FMI to, where relevant, allocate any uncovered losses; cover liquidity shortfalls; address an unbalanced position; and replenish its financial resources, including its own capital, in order to continue to provide critical services. The set of tools should be timely, reliable and have a strong legal basis. The recovery tools should be transparent in order to allow those who would bear the losses and liquidity shortfalls to understand clearly how the allocation of the losses and liquidity shortfalls will be determined by the FMI. The set of recovery tools should be designed to provide appropriate incentives for participants to control the amount of risk that they bring to or incur in the system, participants and owners to monitor the FMI's risk-taking and management activities, and surviving participants to assist the FMI in its default management process. Recovery tools that have a smaller negative impact on non-defaulting participants, financial markets and the financial system more broadly are generally more desirable than tools with larger negative impacts.

On the basis of the analysis in this report, FMIs and the authorities responsible for their regulation, supervision and oversight should consider carefully the following guidance on recovery planning and recovery tools.

- The recovery plans should identify the FMI's critical services, the stress scenarios that may prevent it from being able to provide its critical services as a going concern, and the triggers for implementing the recovery plans.
- The recovery plans should include a set of recovery tools that is comprehensive, effective (in terms of reliability, timeliness, and legal basis) and transparent; provides appropriate incentives; and has the least negative systemic impact.
- The recovery plans and the recovery tools should take into account any constraints potentially imposed by domestic or foreign laws or regulations.
- In order to allow effective implementation of recovery plans, recovery tools should, to the maximum extent practicable, be agreed and established as binding ex-ante.
- Even where there is ex-ante agreement that a tool is available, there needs to be an appropriate balance struck between its automatic application in a given situation (which increases transparency and predictability) and discretion by the FMI to use its judgement (which may

enable a better decision to be taken about which tools are best given the specific circumstances and in which sequence they should be used). In addition, authorities should be kept informed of the decisions made by the FMI in its discretion to exercise judgment.

- FMIs should have in their recovery plans ex-ante, rules-based arrangements that fully allocate through position-based loss allocation any losses caused by participant default that are not otherwise covered.
- FMIs should have in their recovery plans ex-ante, rules-based arrangements that fully allocate any liquidity shortfall caused by participant default that is not covered by available resources. Such arrangements should include, as necessary, rules-based funding from participants to whom funds are owed.
- CCPs should have additional tools in place that allow them to re-establish a matched book, including mechanisms that incentivise a successful auction of unmatched contracts. If such efforts to re-establish a matched book fail, there should be an ex-ante, rules-based arrangement to allow the CCP to achieve a matched book.
- Tools for dealing with liquidity shortfalls can be separable from tools to deal with credit losses. Similarly, tools for establishing a matched book can be separable from tools to deal with credit losses.
- FMIs should have tools to replenish financial resources once losses caused by participant default have been allocated. These tools may include collecting resources from its participants by means of cash calls, raising additional equity capital, or replenishing resources by some other means.
- FMIs should have tools to raise additional capital that may be used to meet losses arising from general business, custody and investment, or operational risks. These tools may include ex-ante commitments from existing shareholders or a capacity to raise capital from participants.
- In many cases the FMI will need not only to recover from a financial shortfall but also to identify and correct the underlying cause of the problem. FMIs should have arrangements to address any underlying structural weaknesses.

1 Introduction

1.1 The purpose of this report

1.1.1 The purpose of this report is to provide guidance to FMIs on the development of comprehensive and effective recovery plans. "Recovery" concerns the ability of an FMI to recover from a threat to its viability and financial strength so that it can continue to provide its critical services without requiring the use of resolution powers by authorities. Recovery therefore takes place in the shadow of resolution. Specifically, for the purposes of this report, recovery is defined as the actions of an FMI, consistent with its rules, procedures, and other ex-ante contractual arrangements, to address any uncovered credit loss, liquidity shortfall, capital inadequacy, or business, operational or other structural weakness, including the replenishment of any depleted pre-funded financial resources and liquidity arrangements, as necessary to maintain the FMI's viability as a going concern.

1.1.2 The line between recovery and resolution is not fixed and is likely to vary from jurisdiction to jurisdiction according to the statutory and regulatory framework of the jurisdictions in which an FMI operates. Accordingly, some jurisdictions may not allow FMIs to use all tools listed in this report and may retain those tools for exclusive use by the resolution authority, if at all.

1.1.3 Notwithstanding the different regimes and tools for allocating credit losses, liquidity shortfalls, and other losses, if a loss or shortfall occurs, that amount will ultimately be allocated in some manner to owners, participants and, potentially, other creditors. If the recovery plans prove to be insufficient, the losses will in the end have to be allocated by the relevant resolution regime or potentially through the applicable insolvency regime. It is therefore essential that recovery plans and tools be designed to allocate losses fully.

1.1.4 The development and, if necessary, implementation of a recovery plan is primarily the responsibility of an FMI itself using its own resources and those of its participants. However, the plan and its implementation are also of critical importance to the authorities responsible for the regulation, supervision, and oversight of the FMI, as well as to the authorities who would be responsible for the FMI if it were to be put into resolution. This report provides guidance to FMIs and, therefore, also provides guidance to the relevant authorities in carrying out their responsibilities associated with the development and implementation of recovery plans and tools.

1.1.5 In April 2012, the Committee on Payment and Settlement Systems (CPSS) and Technical Committee of the International Organization of Securities Commissions (IOSCO) published *the Principles for financial market infrastructures* (PFMI). As noted in the PFMI, the main public policy objectives of the CPSS and IOSCO in setting forth the principles were "to enhance safety and efficiency in payment, clearing, settlement, and recording arrangements, and more broadly, to limit systemic risk and foster transparency and financial stability."[1]

1.1.6 Consequently, the PFMI requires robust risk management appropriate to the critical role played by FMIs in preserving financial stability, including plans for recovery. This report is intended to provide supplemental guidance to the principles and discussion in the PFMI.[2] In particular, this report provides further guidance on the development of recovery plans and a discussion of potential tools an FMI may decide to incorporate into its recovery plans. This report is not intended to create additional requirements for FMIs, or authorities, beyond those set out in the PFMI.

[1] CPSS-IOSCO, *Principles for financial market infrastructures* (April 2012), page 10.

[2] It is also consistent with the FSB's *Key attributes of effective resolution regimes for financial institutions* (the *Key attributes*) (October 2011).

1.2 Relationship to the consultative report on FMI recovery and resolution

1.2.1 In July 2012 the CPSS and IOSCO published a consultative report on *Recovery and resolution of financial market infrastructures*. That report covered both the need for FMIs to have effective plans to recover from financial stresses and the need for jurisdictions to have effective regimes for the resolution of an FMI in circumstances where recovery is no longer feasible. Many of the commentators on that consultative report requested more guidance on what recovery tools would be appropriate for different types of FMI in different circumstances. This new report provides that guidance. Aspects of the consultation report concerning FMI resolution have been included in a new draft annex and will be included in an assessment methodology for the *Key attributes*.[3] Many recovery tools will also be relevant to an FMI under resolution, not least because a resolution authority may wish to enforce implementation of contractual loss allocation rules where any such rules have not been implemented before entry into resolution.

1.3 Content of the report

1.3.1 Section 2 of the report covers recovery planning. It sets out why recovery planning is important, how it relates to the rest of the FMI's risk management and to resolution, the process of recovery planning, and general guidance on the content of recovery plans. Section 3 expands on the content of recovery plans by identifying criteria for assessing the appropriateness of recovery tools and discussing a range of recovery tools that deal directly with financial stresses to the FMI.

[3] See Appendix I *Annex to the key attributes: financial market infrastructure (FMI): resolution of FMIs and resolution of systemically important FMI participants* to the FSB consultation document *Application of the Key attributes of effective resolution regimes to non-bank financial institutions* (August 2013) and the FSB consultation document *Draft assessment methodology for the key attributes of effective resolution regimes* (forthcoming, August 2013).

2 Recovery planning

2.1 The importance of recovery planning

The risk of FMI failure

2.1.1 FMIs are subject to a number of risks that could threaten an FMI's viability and financial strength, including credit, liquidity, and general business risk. For example, for FMIs that take on credit or liquidity risks as part of their payment, clearing, and settlement services, significant credit losses or liquidity shortfalls may arise from the default of one or more participants. For FMIs that hold or invest cash or collateral posted by participants, the failure of a custodian bank or poorly performing investments could create losses for the FMI. General business risk, including the financial consequences of operational and legal risks, could lead to unanticipated extraordinary one-off or on-going losses. The realisation of these risks has the potential to result in an FMI's failure, particularly if recovery plans are not in place.

The importance of maintaining critical services

2.1.2 Systemically important FMIs play an essential role in the global financial system and the disorderly failure of such FMIs could lead to severe systemic disruptions if it caused markets to cease to operate effectively. Ensuring that FMIs can continue to provide critical services as expected, even in times of extreme stress, is therefore central to financial stability. Maintaining critical services should allow FMIs to serve as a source of strength and continuity for the financial markets they serve.

2.1.3 Maintaining the continued provision of an FMI's critical services is particularly important where there is only one FMI providing those services or where there will be substantial practical problems in transferring these critical services rapidly to another FMI. Importantly, in many markets, the option of transferring critical services from a failed FMI to a viable FMI is not a practical recovery option. Given these practical issues, as well as the dependence of financial institutions and the market more generally on FMIs, the continuity of an FMI's critical services even under extreme circumstances is therefore essential. At the same time, FMIs should not expect public funds to be made available to maintain their viability. Thus, having a strong recovery plan is a vital element in enabling the continued provision of critical services.

2.2 The relationship between risk management, recovery and resolution

Risk management and recovery

2.2.1 Systemically important FMIs should have strong and comprehensive risk management practices in order to observe the PFMI. Recovery planning is inherently integrated into that risk management and concerns those aspects of risk management and contingency planning which address the extreme circumstances that could threaten the FMI's viability and financial strength. An FMI should identify in advance, to the extent possible, such extreme circumstances and maintain effective plans to enable it to continue to provide its critical services if these circumstances were to occur. Recovery plans should address stresses that may create any uncovered credit loss, liquidity shortfall, or capital inadequacy, as well as any business, operational or other structural weakness that these stresses reveal. Recovery plans should also address the need for replenishment of any depleted pre-funded financial resources and liquidity arrangements so that the FMI can remain viable.

Recovery and resolution

2.2.2 Despite an FMI's risk management, including the execution of its recovery plans, it is possible that extreme stress could create a situation where an FMI cannot remain viable as a going concern and

may need to conduct an orderly wind down. If an orderly wind-down has failed or is likely to fail, then the FMI may be at risk of entering into bankruptcy or insolvency – regimes that do not have the preservation of financial stability as an objective. An orderly wind-down may also be deemed by authorities to be inappropriate, perhaps because the FMI is the sole provider of critical services and a viable alternative to using that particular FMI does not exist. Therefore, even if a jurisdiction and its FMIs are in full observance of the PFMI, then as set out in the *Key attributes*, FMIs "should be subject to [a] resolution regime[] that appl[ies] the objectives and provisions of the *Key attributes* in a manner appropriate to FMIs and their critical role in financial markets. The choice of resolution powers should be guided by the need to maintain continuity of critical FMI functions".[4]

2.3 The process of recovery planning

Purpose

2.3.1 The purpose of a recovery plan is to document the information and procedures necessary to allow the FMI to effect recovery and continue to provide its critical services when its viability is threatened. The plans enable the FMI, its participants, and other relevant stakeholders to prepare for extreme circumstances, increase the probability that the most effective tools to deal with a specific stress will be used, and reduce the risk that uncertainty about which tools will be used will hinder the effectiveness of recovery actions. Recovery plans should be formulated on the presumption that any stress can be met by the FMI's, its owners', and its participants' own resources and allocation of exposures. Accordingly, recovery plans should not assume any extraordinary form of state or central bank support. Recovery plans also assist resolution authorities in preparing and executing their resolution plans for the FMI.[5]

Coverage

2.3.2 All systemically important FMIs should have comprehensive and effective recovery plans.[6] Recovery plans are a requirement under the PFMI. The guidance contained in this report expands on the PFMI and is consistent with the *Key attributes*.[7]

Governance

2.3.3 The primary responsibility for the development and implementation of an FMI's recovery plan rests with the FMI itself. The plan should be formally endorsed by the FMI's board of directors. The FMI should have an effective governance structure and sufficient resources to support the recovery planning process. This includes clearly defining the responsibilities of business units, senior executives, and board members, and identifying a senior executive responsible for ensuring that the FMI observes recovery planning requirements and that recovery planning is integrated into the firm's overall governance processes. Principle 2 of the PFMI is directly relevant to the governance of recovery plans.

Powers and enforceability

2.3.4 The FMI should ensure that, to the extent possible, it has the powers to implement the tools it may need to use in recovery. Effective implementation of recovery plans requires that, to the extent practicable, the recovery tools to be used are established ex-ante as binding on those involved. This is

[4] See key attribute 1.2.

[5] Annex III of the *Key attributes* covers the relationship between recovery and resolution planning.

[6] See paragraph 1.20 of the PFMI on the systemic importance of FMIs.

[7] See key consideration 4 of Principle 3, on the framework for the comprehensive management of risks, in the PFMI. See also key attributes 11.2 and 11.5, calling for robust and credible recovery plans.

most important, and also most feasible, in the case of events that are both relatively well-defined and where a substantial proportion of a loss may reasonably be allocated across owners and participants, for example, the default of participants. It may be less feasible to establish binding tools ex ante in the case of events that are less well-defined, such as chronic or extraordinary business losses or other structural weaknesses, or where the recovery plans involve third parties that are not subject to the FMI's rules or arrangements. In such cases, the recovery tools used are more likely to need to be tailored to the specific circumstances.

2.3.5 The FMI should also assess the legal enforceability of its plans, taking into account any constraints potentially imposed by domestic or foreign laws or regulations. The range of measures and tools employed by the FMI in its rules and contractual arrangements may vary across jurisdictions because, for example, in some jurisdictions some tools may not be allowable under the applicable legal framework or may be reserved for use by resolution authorities rather than by an FMI in recovery. In every case, however, it is important that a jurisdiction's laws permit for recovery tools that can allocate losses in full.

Judgment in the use of tools

2.3.6 Closely related to powers and enforceability is the issue of the degree of the FMI's discretion to exercise judgment in deciding whether or not to use specific tools and, if multiple tools are to be used, in which order they should be used. Even where the FMI has ex-ante agreement that a tool may be used, there is still a choice between making the use of that tool automatic in a given situation and granting the FMI the discretion to exercise judgment about its use or timing.

2.3.7 In making this choice, a balance may need to be struck between automaticity, which increases transparency and predictability for participants, owners, and third parties about the action that will be taken, and discretion to exercise judgment, which may enable a better decision to be made about the use of tools in light of the specific circumstances, including market conditions. Constraining such discretion, for example by putting reasonable bounds on the exercise of judgment to limit the use of particular recovery tools or to impose conditions on the use of particular tools, helps to increase transparency and predictability and to ensure that any exercise of judgment is consistent with the broader objectives of the recovery plan. In addition, authorities should be kept informed of the decisions made by the FMI in its discretion to exercise judgment.

2.3.8 The FMI should also consider the degree to which aspects of its recovery plan need to be shared with its participants in order to observe its transparency obligations in accordance with Principle 23 of the PFMI and so that participants can assess the risks they face by participating in the FMI.

Identification of critical services, stress scenarios, triggers, and appropriate recovery tools

2.3.9 In order to develop comprehensive and effective recovery plans, an FMI should identify its critical services. The purpose of identifying critical services is to focus recovery plans on the ability of the FMI to continue to provide these services even when it comes under extreme stress. Accordingly, the identification of critical services should be done in close coordination with the relevant authorities.

2.3.10 An FMI should also identify scenarios that may prevent it from being able to provide its critical services as a going concern and assess the effectiveness of a full range of options for recovery or orderly wind-down, and an FMI should define the criteria (both quantitative and qualitative) that will trigger the implementation of part or all of the recovery plans. Finally, the FMI should develop recovery tools to help maintain critical services even in extreme stress scenarios. These essential elements of a recovery plan are discussed further in Section 2.4.

Testing and review

2.3.11 To help ensure that recovery plans can be implemented effectively, an FMI should test and review these plans, for example by carrying out periodic simulation and scenario exercises, at least

annually and following material changes to its plans, rules, or procedures. An FMI may choose to conduct this testing and review, to the extent practicable, as part of its annual testing and review of its participant-default rules and procedures, in accordance with Principle 13 of the PFMI.[8] The FMI should update its recovery plans as needed following the completion of each test and review.

Implementation if needed

2.3.12 An FMI's governance arrangements should provide for timely and effective implementation of recovery plans, including documented decision making processes in a crisis. An FMI should also have the capacity to identify and provide to others involved in the recovery plans, including its participants, the information they need in the FMI's implementation of the plans on a timely basis. This includes both the information needed ex-ante to enable others to prepare for implementation and the information needed once an FMI has initiated its recovery plans in order to enable implementation to take place as smoothly as possible.

2.4 The content of recovery plans

High level summary

2.4.1 The high level summary should provide an overview of what the recovery plans consist of and how they will be implemented. This includes the identification of the FMI's critical services, stress scenarios, and recovery triggers, as well as a substantive description of its recovery tools and tools to address structural weaknesses. The high level summary should also address how these tools may be used.

Critical services

2.4.2 The FMI should identify those services it provides that are critical. "Critical" refers to the importance of the service to the FMI's participants, other FMIs, and to the smooth functioning of the markets the FMI serves and, in particular, the maintenance of financial stability. In general, for a systemically important FMI, its payment, clearing, settlement or recording functions will be regarded as critical. The failure of an FMI to provide a critical service would likely have a material negative impact on participants or significant third parties, give rise to contagion, or undermine the general confidence of market participants. Such negative impacts are dependent, in part, on the degree of substitutability of the service, that is, whether the service is also provided by another FMI (or other entity) and whether users of a potentially failed service can practicably switch to an alternative service.[9] If an FMI provides ancillary services to its critical services, judgment will be needed as to whether the recovery plan needs to assure continuity of these services.

Stress scenarios

2.4.3 As required by Principle 3 of the PFMI, an FMI should identify scenarios that may prevent it from being able to provide its critical services as a going concern.[10] These scenarios should take into account the various risks to which the FMI is exposed, which will vary across different types of FMIs and even across FMIs of the same type. These scenarios may include, but are not limited to, credit losses or liquidity shortfalls created by a participant default, a wide range of general business losses, or the

[8] See also key attribute 11.10.

[9] The FSB document *Recovery and resolution planning for systemically important financial institutions: guidance on identification of critical functions and critical shared services* (July 2013) is aimed at banks but contains elements concerning the identification of critical services that may also be relevant for FMIs.

[10] See also key attribute 11.5.

realisation of investment losses (from financial assets the FMI holds at third parties). They should also include the risk associated with the failure of a third party to perform its critical functions (for example, the failure of a settlement bank or other service provider). Where the FMI is part of a group it may be at risk from unrelated activities in other entities in the group, or where it has links with other FMIs it may be at risk from failures in those FMIs. The underlying assumptions of the scenarios should be sufficiently severe. Both idiosyncratic and system-wide stress scenarios should be considered, taking into account the potential impact of domestic and cross-border contagion in crises, as well as simultaneous crises in several significant markets.

Triggers

2.4.4 FMIs should define the criteria (both quantitative and qualitative) that will trigger the implementation of part or all of the recovery plans. This will help avoid undue delays in the implementation of the plans.

2.4.5 In some cases the triggers will be obvious. For example, in the case of participant defaults, recovery plans will be triggered when the FMI has exhausted the pre-funded financial resources or the liquidity arrangements it has in place to deal with such defaults or when it has become unlikely that the pre-funded financial resources or liquidity arrangements will be sufficient to deal with the defaults.

2.4.6 In other cases, such as chronic or extraordinary losses from general business risks, more thought may be needed to devise suitable recovery triggers. In these circumstances, the triggers should serve mainly as an indicator that the scale of a previously identified problem has become sufficiently serious that recovery plans may need to be implemented. These triggers should lead to a pre-determined information and escalation process within the FMI's senior management and its board of directors and to careful consideration of what action should be taken. The triggers should occur early enough to provide sufficient time for plans to be implemented. Implementation will typically take place after discussion with the relevant authorities.[11]

Recovery tools

2.4.7 FMIs should identify appropriate recovery tools, indicate the necessary steps and time needed to implement them, and assess the associated risks to the FMI, its participants, linked FMIs, and the market more generally. Possible recovery tools are discussed in Section 3.

2.4.8 Included in the recovery plans should be tools to cover extreme stress scenarios - whether or not caused by participant default - that are not covered by pre-funded financial resources or where the FMI does not have sufficient liquidity arrangements to meet its obligations on time. Also included should be tools to deal with other losses, in particular from those general business risks that may materialise more slowly. The FMI may also need tools to strengthen its capital situation, for example, recapitalisations after extraordinary losses, capital conservation measures such as suspension of dividends and payments of variable remuneration, or voluntary restructuring of liabilities through debt-to-equity conversion.

2.4.9 In dealing with financial shortfalls, the most appropriate recovery tools may in some cases be independent of the specific cause of the shortfall. However, in other cases, tools may be tailored as appropriate to address different causes of stress, because they may be easier to enforce or considered to create more appropriate incentives. The likely effectiveness and potential risks of each recovery tool should be assessed, including the potential impact on participants and the market generally. Where multiple tools are involved, an indication of the planned sequencing of the use of these tools and an estimate of the time needed to implement each tool should be included in the recovery plan.

[11] The FSB document *Recovery and resolution planning for systemically important financial institutions: guidance on recovery triggers and stress scenarios* (July 2013) provides more discussion on the design of triggers.

Tools to address structural weaknesses

2.4.10 In most cases the FMI will not only need to recover from the financial shortfall but will also need to identify and address the underlying cause of the problem if it is to continue operating as a going concern. In these cases, the recovery action taken will depend on the specific stress scenario that led to the problem. For example, if a settlement bank has failed, the FMI will need to have plans for an alternative method of settlement.

2.4.11 If the problem is ongoing business losses, the FMI may need to restructure its business to correct the underlying problem. Mechanisms to address structural weaknesses include revising risk management frameworks, replacing management, revising business strategy (including cost or fee structures), restructuring services provided, selling business units, merging with another FMI, reducing risks (for example, changes in investment or custody policy) and taking measures to reduce complexity and interconnectedness.

2.4.12 In order to be prepared to address structural weaknesses, an FMI should carry out a strategic analysis.[12] This strategic analysis may include identifying and preparing for potential material impediments to effective and timely execution of tools to address structural weaknesses and describing processes for determining the value and marketability of material business lines that the FMI may wish to sell. If an FMI wants to sell a part of its business, it should identify and address legal, regulatory or IT-related obstacles that would make it difficult to execute the sale in a timely manner (ie within the period for which it has liquid net assets funded by equity, as required by Principle 15 of PFMI). For example, an FMI may need to obtain approvals from authorities or it may need to make sure that it can continue to use an IT system that is shared with a business line that may be sold. Where the business line involves a critical service, it is essential that the plan ensures the continuity of provision of that service.

2.4.13 Tools to address structural weaknesses are specific to individual FMIs and the specific stresses that they may face. Because it is difficult to generalise about their use, such tools are not considered further in this report.

Links between FMIs

2.4.14 Where there are links between FMIs, the design and implementation of one FMI's recovery plan may impact the other FMIs. Where this is the case, linked FMIs should coordinate the relevant aspects of their plans. This is likely to be particularly important where there are financial exposures between the FMIs. The recovery plans of each FMI should address the allocation of uncovered losses, taking into account the approach of the linked FMI.

2.5 Role of the authorities in recovery

2.5.1 The responsibilities of authorities in an FMI's recovery planning are part of their general responsibilities for regulation, supervision, and oversight of the FMI as set out in the PFMI.[13]

Assessment of recovery plans

2.5.2 An FMI's regulator, supervisor, or overseer should periodically assess the adequacy of the FMI's recovery plans (taking into account the risk profiles of both the FMI and market participants) and, where deficiencies exist, have the necessary powers to ensure the FMI corrects the deficiencies. Further, to the extent possible, the relevant authorities should also consider the potential impact on direct and indirect

[12] Cf *Key attributes*, Annex III, paragraph 2.3.

[13] See Section 4.0 of the PFMI.

participants, financial markets served by the FMI and the financial system more broadly when assessing the adequacy of the FMI's recovery plans.

2.5.3 Where an FMI is systemically important to multiple jurisdictions or is subject to the authority of multiple regulators, supervisors, or overseers, cooperation among the authorities in line with Responsibility E of the PFMI is needed to conduct this assessment effectively. The relevant authorities should also coordinate with other relevant authorities, including the FMI's resolution authorities, to ensure consistency between recovery and resolution plans.

2.5.4 In reviewing recovery plans, authorities may need to consider the consistency and systemic impact of recovery plans if these were to be implemented by several FMIs at the same time. Authorities may also need to consider the consistency and systemic impact of recovery plans if one or more systemically important participants of an FMI implement their recovery plans in parallel with the implementation of the FMI's recovery plan.

2.5.5 Furthermore, resolution authorities should be provided with access to the recovery plans and be kept informed of progress in implementing the plans so that they have some advance notice in case recovery actions fail.

Oversight and enforcement of implementation of recovery plans

2.5.6 In the event that an FMI's recovery plans need to be implemented, the relevant regulatory, supervisory, and oversight authorities should oversee that implementation consistent with their respective responsibilities. Coordination and information-sharing between all relevant parties are critical to the successful execution of the FMI's plans.

2.5.7 It is possible that an FMI's execution of relevant recovery measures may be ineffective (for example, in terms of timeliness). In addition, factors such as unanticipated conflicts of interest, uncontrollable external factors and human error could result in inadequate execution. In such cases, the relevant authorities should have the necessary powers to require implementation of recovery measures and drive optimal execution. These powers may include issuing directions or orders, imposing fines or penalties, or even forcing a change of management, as appropriate. These powers are compatible with the responsibilities in the PFMI, especially Responsibility B.

3 Recovery tools

3.1 Introduction

3.1.1 This section provides an overview of tools that FMIs may include in their recovery plans, including considerations that should be taken into account when designing or adopting these tools. It explains how the individual tools are intended to work and what their impact on the FMI, its participants, linked FMIs and the financial system more widely is likely to be. The appropriateness of recovery tools will vary based on particular circumstances and on the type of FMI. Accordingly, each FMI should consider carefully if, when, and in what combination and sequence, the application of particular recovery tools would be appropriate. This chapter is intended to help the FMI (and its regulators, supervisors and overseers) in this task.

3.1.2 The recovery tools and mechanisms presented below are not intended to constitute an exhaustive list. FMIs may have or seek to design additional or alternative tools. As noted above, some of the recovery tools set out in this section may also be available to the resolution authority either as separate statutory resolution powers in their own right or as a result of the resolution regime, or the FMI's own rules, conferring on the resolution authority the legal ability to enforce the FMI's recovery tools.

3.2 Risk categories and failure scenarios that may require use of recovery tools

3.2.1 FMIs can be exposed to legal, credit, liquidity, general business, custody, investment and operational risks.[14] Not all FMIs are exposed to these risk categories equally or in the same manner. Most importantly, not all FMIs assume credit risk.[15] The manifestation of the risks may have different causes and may also result in different types of failure scenarios. For example, credit or liquidity risks may result from the default of a participant and, if not adequately addressed, could result in failure of an FMI over a short timeframe. Similarly, the crystallisation of investment risks may also have sudden effects requiring immediate activation of recovery tools, for example in the event of a failure of a cash settlement agent or treasury counterparty. In contrast, the incidence of operational or business risk is typically not related to a participant default and may crystallise either in a very short period of time or over a much longer period. The following risks and failure scenarios are particularly important for recovery planning.

Uncovered losses caused by participant default

3.2.2 Credit risk 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. Credit risk will typically crystallise if one or more participants default. For some types of FMI (such as CCPs), credit risks are likely to be the most important source of uncovered losses that would cause the failure of an FMI. Recovery tools are therefore needed for addressing and allocating uncovered credit losses, in accordance with key consideration 7 of principle 4 of the PFMI.

Uncovered liquidity shortfalls

3.2.3 Liquidity risk is the risk that a counterparty of the FMI, or the FMI itself, has insufficient funds to meet its financial obligations when due, even though it may be able to do so in the future. Liquidity risk

[14] Definitions in this section are taken from the PFMI. See Annex H of the PFMI.

[15] In this context, the risk of non-payment of ordinary business accounts receivable, including service fees owed by participants, can be considered under the heading of general business risk.

may crystallise in particular when one or more FMI participants default, although some FMIs may be exposed to liquidity risk even when there is no default of a participant or of another entity (eg certain SSSs or payment systems in the case of problems with liquidity providers). Although credit and liquidity risks are distinct risk factors, there is often significant interaction and interdependency between the two as the resources the FMI maintains to address credit risk may be insufficiently liquid to enable the FMI to meet its own payment obligations to other participants when due, which could put the FMI's viability at risk. Recovery tools are therefore needed for addressing and allocating uncovered liquidity shortfalls, in accordance with key consideration 10 of principle 7 of the PFMI.

Losses from general business risk

3.2.4 General business risk refers to the risks and potential losses arising from an FMI's operation as a business enterprise that are not related to participant default or to custody and investment risk. It includes any other potential impairment of the FMI's financial or capital position. It may materialise as an extraordinary one-off loss or as recurring losses, and thus it could play out in a very short period of time or over a longer period. A failure to manage general business risk could result in a disruption of an FMI's business operations or threaten its long run viability as a going concern.

Losses from custody and investment risks

3.2.5 Investment risk is the risk of loss faced by an FMI when it invests its own or its participants' resources, such as cash or other collateral. Investment risk could jeopardise the viability of an FMI if it results in significant financial loss. For example, if an FMI were to invest its own resources or collateral posted by its participants in instruments that were subject to market or credit risk, and such risks materialised, financial difficulties could arise by way of either direct financial impairment to the FMI or an inability to meet claims by participants seeking the return of posted collateral. Similarly, an FMI can be exposed to custody risk and could suffer losses on assets held in custody in the event of a custodian's (or sub-custodian's) insolvency, negligence, fraud, poor administration or inadequate recordkeeping.

3.3 Guidelines for appropriate recovery tools

3.3.1 A number of guidelines can be identified that should inform an FMI when determining an appropriate set of tools to meet its recovery objectives. There is a need to carefully consider the different effects that recovery tools may have on the FMI, FMIs to which it is linked, its participants and the financial system as a whole. The tools should be designed to, in the aggregate, address all uncovered credit losses, liquidity shortfalls or unbalanced positions, to make good any capital shortfalls, and restore other financial resources to the minimum level required by regulation, while minimising, to the extent possible, the negative impact on participants and the financial system as a whole. The tools should also help the FMI to address the weaknesses that necessitated activation of the recovery plan. The following guidelines are designed to help FMIs evaluate the strengths and weaknesses of tools so that they can choose an appropriate tool (or set of tools) for a particular recovery scenario.

3.3.2 FMIs should endeavour to develop a set of tools that meets the characteristics below to the greatest extent possible. However, because an individual tool may not satisfy the full set of characteristics, FMIs will need to determine which tool or set of tools offers the best trade-off for a given recovery scenario. Regulators with authority over FMIs should be aware of and should consider such trade-offs in performing their responsibilities.

(i) Comprehensive

The set of recovery tools should provide a comprehensive description of how the FMI would, where relevant, allocate any uncovered losses; cover liquidity shortfalls; address an unbalanced position; and replenish its financial resources, including its own capital, in order to continue to provide critical services in all relevant circumstances. The set of recovery tools should be flexible

enough to apply to a wide range of scenarios and should take account of the FMI's ongoing risk management as well as the event that has triggered the use of recovery tools.

(ii) Effective

There should be a high degree of confidence that the set of recovery tools will be effective. Therefore, the set of tools should be reliable, available in a timely manner and have a strong legal basis on which it can be enforced.

- *Reliability:* there should be a high degree of certainty that the FMI will be able to implement each tool in all relevant circumstances, including in times of stress. FMIs should take into account the extent to which participants, owners and third parties would have sufficient resources to fulfil their potential obligations when considering the reliability of a tool.
- *Timeliness:* the set of tools should provide the FMI with the required resources as soon as they are needed.
- *Legal basis:* each tool should be consistent with the FMI's rules, membership agreements, contracts, and the regulatory and legal frameworks in all relevant jurisdictions.

(iii) Transparent

The recovery tools should allow those who would bear the losses and liquidity shortfalls to understand clearly how the allocation of the losses and liquidity shortfalls would be determined given the use of such tools both individually and in the aggregate.[16]

(iv) Provide appropriate incentives

The set of recovery tools should be designed to provide appropriate incentives for owners and participants. In particular, they should provide incentives for:

- participants to control the amount of risk that they bring to or incur in the system;[17]
- participants and owners to monitor the FMI's risk-taking and management activities; and
- surviving participants to assist the FMI in its default management process.

FMIs should be mindful of the incentives that a tool, or set of tools, creates for both direct and indirect participants to clear and settle trades safely and efficiently and should avoid unnecessary disincentives to participation in well-designed FMIs.

(v) Minimum negative impact

Recovery tools that have a smaller negative impact on surviving participants, financial markets and the financial system more broadly are more desirable. It is especially important that any potential pro-cyclical effects are taken into account in making this determination.

[16] The set of recovery tools should be evaluated against PFMI Principle 23, Key Consideration 2 which states that "An FMI should disclose clear descriptions of the system's design and operations, as well as the FMI's and participants' rights and obligations, so that participants can assess the risks they would incur by participating in the FMI."

[17] That is, tools may be designed such that surviving participants who bring a greater amount of risk to the FMI face greater losses in the event of the FMI's recovery.

The allocation of losses and liquidity shortfalls

3.3.3 Uncovered credit losses and, where relevant, liquidity shortfalls could be allocated to direct participants, indirect participants, third-party institutions and/or owners on the basis of and to the extent that they are permitted by ex-ante arrangements such as the FMI's rules or specific provisions in arrangements between direct participants and their clients. In addition, allocation of losses and liquidity shortfalls should, in accordance with Principle 23, be transparent to all participants to allow them to assess the risks they would incur by participating in the FMI. Thus, such ex-ante arrangements should be clearly disclosed.

3.3.4 The scheme for allocating losses and liquidity shortfalls does not affect the totality of the loss that must be absorbed by the financial system as a whole once the loss has occurred, but rather affects how the loss will be distributed throughout the financial system. Thus, given a loss event, losses that are directed away from one type of entity will necessarily be allocated to another type of entity, and losses that are not allocated by one method will necessarily be allocated by another method. The allocation scheme may affect the ability of the financial system as a whole to absorb financial losses and provides incentives, both positive and negative, that will influence the behaviour of owners and direct and indirect participants.

3.3.5 For example, there may be benefits to sharing overall losses from credit risks and liquidity shortfalls as widely as possible so as to minimise the loss that each entity would have to bear individually, which may increase the ability of the financial system as a whole to bear the overall loss. For some types of FMIs the concept of mutual exposure is a key risk control. Some loss-allocation schemes might even extend beyond owners and direct participants to indirect participants and third parties (eg other creditors or insurers) provided there is ex-ante binding agreement on that extension. However, such wide loss sharing may not necessarily reflect the ability or willingness of each entity to create, to control, and to absorb risks, respectively.

3.3.6 From another perspective, there may be benefits to allocating losses to those who have chosen roles that are consistent with absorbing such losses.

3.3.7 Owners of the FMI, who benefit from the profits of the FMI, may be exposed to a share of the losses in a manner consistent with the extent of their investments and the FMI's legal basis. Allocation of business losses will generally take this approach. In many FMIs, allocation of credit losses also takes this approach as an early part of the "default waterfall"; indeed, some jurisdictions require such so-called "skin in the game" allocations. Losses can be imposed on owners through assigning losses to the FMI itself or (in the case of recapitalisation) by diluting, subordinating or eliminating the interests of shareholders in the FMI. There are some practical difficulties with the use of this tool. In FMIs organised as limited liability entities, shareholders cannot lose more than the totality of their investments and hence the amount of resources which can be obtained from them may be less than the loss faced by the FMI (especially when this loss is caused by credit risk). In this respect, it may be more effective to allocate losses to participants of the FMI. However, it is also necessary to maintain appropriate incentives for owners to ensure that the FMI is properly managed. Thus, even when recovery tools rely primarily on participants, they should not protect the owners against the default risk of the FMI.

3.3.8 For FMIs with mutualised loss allocation schemes, direct participants are exposed to losses to the extent specified in ex-ante rules and agreements, and indirect participants may be exposed to losses to the extent specified in ex-ante contracts with the relevant participant (for example, a participant that clears contracts on behalf of the indirect participant). Liquidity shortfalls can also be mutualised.

3.3.9 In many cases, direct participants will contribute significant portions of the FMIs pre-funded default resources. Direct participants may also be committed to contribute additional resources in the event of a default. Credit losses may be allocated to all direct participants, or may be limited based on product classes, with participants only being exposed to defaults in product classes in which they participate (or based on the extent of that participation). Allocations may also be limited based on the fact, or extent, of participation in links with another FMI.

The role of incentives

3.3.10 Loss allocation tools may create incentives, both positive and negative. In particular, the tools may create ex-ante incentives that affect risk-taking behaviour, the likelihood of losses or liquidity shortfalls occurring, and, thus, the aggregate amount of loss or liquidity shortfall if stress events do occur. For example, stakeholders exposed to losses have incentives to monitor the FMI's risk-taking activities and risk management and to require the FMI to prudently manage the risks. They may also have increased incentives to reduce the risks created by their own positions and activity.[18]

3.3.11 Incentives may be affected when a tool creates present day costs, including capital charges imposed on participants by their regulators to reflect the participants' exposure to risk of loss.

3.3.12 To the extent losses are allocated to direct participants rather than indirect participants, then users of the FMI who have a choice about whether or not to participate directly could face increased incentives to become (or remain) indirect participants, which in itself may carry potential risks. Consistent with Principle 19, an FMI should identify and manage any risks it may face from the balance between direct and indirect participation.

3.3.13 Certain loss allocation tools may incentivise participants - direct and/or indirect - to reduce their use of a particular FMI in favour of clearing or settling bilaterally.[19] Indeed, certain tools may incentivise a participant's complete exit from use of the FMI if usage exposes it to risks that are considered unacceptable, either from the participant's risk management point of view (if it has a choice about participation) or in the view of the participant's regulator.

3.3.14 Where participants reduce their use of an FMI, this may result in risks remaining in bilateral transactions. In the case of CCPs, this would contradict the regulatory agenda of the G20 calling for expanded use of central clearing.

Reliability and timeliness of resources

3.3.15 Some recovery tools are based on the FMI using prefunded resources or on the FMI borrowing funds it owes or reducing its liabilities; such tools are within the direct control of the FMI because they can be implemented without requiring new funds to be paid in by, for example, participants or owners. However, other tools are based on non-prefunded resources such as assessments or capital calls on participants and owners; because these require pay-ins to the FMI, they may raise issues of reliability and timeliness. Accordingly, the use of the two types of tools needs to be appropriately balanced.

Comprehensiveness of the recovery plan

3.3.16 As noted earlier, once a loss materialises, if it is not allocated to one entity it will necessarily be allocated to another entity, and if it is not allocated by one method it will necessarily be allocated by another method. If an FMI's rules do not provide a comprehensive description of how all uncovered losses are allocated, the FMI may be forced to struggle through the crisis in a disorderly manner when all pre-arranged tools are exhausted, which may destabilise the financial markets as a whole and put public funds at risk.

[18] Participants, whether direct or indirect, who bring risk to an FMI may already have significant incentives to mitigate those risks. For example, the risk a participant brings to the FMI might attract larger initial margin requirements.

[19] A direct participant might limit the amount of proprietary transactions it will engage in, or the amount of customer risk it will take on. It may also influence the pricing of its services to indirect participants.

3.4 Summary of recovery tools for FMIs

3.4.1 There are different types of recovery tools with different purposes that might be applied in combination or in sequence.

3.4.2 An FMI is required under the PFMI to have recovery tools that allow it to allocate fully any uncovered losses and liquidity shortfalls caused by participant default. The FMI also needs to be able replenish its financial resources. Moreover, the FMI needs to be in the position to allocate losses or to effect an orderly wind down following losses that are not related to participant default, such as losses resulting from general business risk. Finally, an FMI needs to address the underlying structural weaknesses that have led to the manifestation of risks and losses.

3.4.3 Against this background, the following recovery tools can be distinguished:

(i) tools to allocate uncovered losses caused by participant default;

(ii) tools to address uncovered liquidity shortfalls;

(iii) tools to replenish financial resources

(iv) tools to allocate losses not related to participant default;

(v) tools for CCPs to re-establish a matched book; and

(vi) tools to address structural weaknesses.

Tools (i) through (v) are discussed in Sections 3.5 to 3.9. As mentioned in paragraph 2.4.13, tools to address structural weaknesses are not addressed further in this report. Of note, the combination and sequence of an FMI's recovery tools can be used to allocate uncovered liquidity shortfalls in a manner that can be either directly related to or independent of the combination and sequence of the tools used to allocate any associated credit losses. Likewise, the steps that a CCP can take to re-establish a matched book following a participant default can be either directly related to or independent of the combination and sequence of the tools used to allocate any associated credit losses.

3.5 Tools to allocate uncovered losses caused by participant default

Cash calls on participants ("assessment power")

3.5.1 There may be circumstances in a default or recovery scenario where an FMI's prefunded financial resources will not be sufficient to address all losses. One means to address such remaining losses could be through rules requiring direct participants to commit to provide additional resources, typically in the form of cash, in order to meet a shortfall. This process is often referred to as an "assessment power," and typically applies to cases of participant default.

3.5.2 The amount of the commitment for each direct participant could be calibrated in a number of ways, such as (a) proportional to prefunded default fund contributions, (b) proportional to activity at the FMI (eg based on relative volumes or values processed over a period of time, or outstanding net or gross positions at a point in time), or (c) a fixed amount irrespective of each participant's assets or activity at the FMI (eg an assessment of up to EUR 50 million each).[20]

3.5.3 From the perspective of a participant, a potential cash call would represent a controllable exposure if the maximum size of the cash call is either (a) capped by a fixed amount or (b) tied to and limited by the absolute value of the participant's directly controllable activity or position in the FMI. In contrast, a potential cash call could represent an uncontrollable exposure if the maximum size of the

[20] The extent to which direct clearing members would pass on these losses to their clients (indirect participants), whether through ex ante or ex post increases in fees, or otherwise, is outside the scope of this report.

cash call is neither capped nor limited by the participant's directly controllable activity or position in the FMI.

3.5.4 Irrespective of what they have agreed to ex-ante, the capacity and willingness of participants to meet such cash calls promptly if the need actually arises may vary. Since assessments could require participants to provide significant assets and liquidity to the FMI in what are likely to be times of stress, they could cause pro-cyclical solvency and liquidity strains for those participants, especially if they are not able to evaluate and control ex-ante the potential amount of these calls.

3.5.5 The ability of assessments to fully meet a financial resources shortfall depends on whether, in the aggregate, the maximum size of the assessments is capped at a level below that of the shortfall. If the aggregate cash call is capped below that level then use of this tool alone would not be comprehensive. If an FMI's rules do not provide a comprehensive description of how all uncovered losses are allocated, it will exacerbate the uncertainty caused by the losses.

3.5.6 The use of assessments may also affect incentives for risk taking and risk management. The effect may depend on how the assessments are allocated between participants. If, for example, the assessment is in proportion to default fund contributions, then to the extent that default contributions proxy the risk brought by participants to the FMI, the assessment power would provide ex ante incentives for participants to limit the risks that they bring to the FMI.

3.5.7 Uncontrollable cash calls present important problems with respect to incentives. For instance, some participants might find such an uncontrollable liability unacceptable for risk or commercial reasons and so would have an incentive to exit the FMI ex-ante. Other participants might be prohibited by their regulators from participating in arrangements where liability is uncontrollable and thus they would be required to exit the FMI ex-ante.

3.5.8 In contrast, controllable activity-based or position-based cash calls, which are one form of position-based loss allocation tools, could increase incentives to use the FMI to the extent their comprehensiveness in meeting financial resources shortfalls reduces the likelihood of an FMI's default. Moreover, given that all terms and conditions are clearly established under the FMI's rules, the size of the potential loss is measurable and controllable if it is position-based, however large each participant's potential net "gain" or "amount due" may turn out to be.

Position-based loss allocation tools

3.5.9 In general, position-based recovery tools can take various forms, including steps that involve borrowing funds owed to participants (eg rules-based loans, swaps, or repos to address liquidity shortfalls); steps that decrease the amounts of payments owed on outstanding contracts (eg variation margin haircuts or reduced pay-outs to address credit losses and liquidity shortfalls); and steps that decrease outstanding gross or net positions (eg tear-up or forced allocations of contracts to address credit losses and liquidity shortfalls).

3.5.10 Position-based loss allocations are powerful tools. They are potentially comprehensive, in that any shortfall or loss resulting from a participant default cannot exceed the associated amount owed to non-defaulting participants. They are reliable, in that, insofar as an FMI's pay-outs are only made after all pay-ins are received, there is no performance risk, because they do not require new pay-ins from participants. For the same reason they are timely, in that they can be executed immediately because they do not depend on, or require time for, additional pay-ins from participants.

3.5.11 Given that all terms and conditions are clearly established under the FMI's rules, the size of potential loss is measurable and controllable within statistical confidence levels since, however large each participant's potential net "gain" or "amount due" may be turn out to be, it is based on that participant's controllable and statistically predictable position. Position-based allocations incorporated in an FMI's ex-ante rules are also transparent.

3.5.12 In principle, position-based loss allocation could be used in advance of, in conjunction with, or following any other recovery tool for loss allocation. However, by effecting an extraordinary reduction in the FMI's obligations to participants, their use may have negative effects on participants' confidence in the FMI. Thus, FMIs should use such tools only when the financial resources of the default waterfall of the FMI are exhausted.[21]

3.5.13 One means of enforcing prompt collection of pre-existing assessment obligations (ie making this tool more reliable and timely) could be the use of a participant's proprietary assets held at the FMI (eg margin, securities holdings or cash deposits) as collateral for such obligations. This type of arrangement should only be used (a) where the use of such proprietary assets as collateral for this obligation is provided for in the rules ex ante, (b) to the extent of any such committed obligation pursuant to the rules and (c) to the extent that paid-for participant's client assets are fully protected and not affected.

Variation margin haircutting by CCPs

3.5.14 An important example of a position-based loss allocation recovery tool is variation margin haircutting by CCPs. When haircutting variation margin, the CCP reduces pro rata the amount it is due to pay participants with in-the-money (net) positions, while continuing to collect in full from those participants with out-of-the-money (net) positions.[22] Such a power may be capped at or below an amount equal to 100 per cent of the total amount owed to each participant with an in-the-money (net) position. Where a CCP does not have a direct contractual relationship with indirect participants (ie clients of direct participants), the impact on such indirect participants will depend upon their contractual arrangements with their respective direct participants.

3.5.15 Unless capped at less than 100 per cent of the amount owed, variation margin haircutting could be expected to cover comprehensively, reliably and promptly a loss caused by participant default. Theoretically, variation haircutting can be done for a fixed period or on an ongoing basis pending participant votes or other decision point. However, over time, participants may become unwilling to honour required variation margin payments on out–of-the-money positions absent assurance of full collection of prospective gains on in-the-money positions from the CCP pending legal proceedings. Moreover, regulators may be forced to conclude that a CCP that is not able to promptly re-establish its ability to make payments may lack sufficient financial resources to continue operation, such that resolution or insolvency procedures may need to be initiated.

3.5.16 A participant's loss would be limited by the size of the increase in the value of their positions. Thus, variation margin haircutting represents a measurable and controllable exposure within statistical confidence levels.

3.5.17 Since the size of the loss that a participant can face is related to the riskiness of its positions, this tool should provide incentives for participants to monitor the risk that they bring to the CCP ex ante. Losses are allocated only to participants who have experienced a gain. While this may concentrate the loss on a subset of participants, these participants may be in a better position to absorb the losses.

3.5.18 While variation margin haircutting thus appears to be a suitable and effective tool for allocating uncovered losses caused by participant default, there are some limitations that need to be observed. For example, in the most extreme cases, variation margin haircutting alone might not be comprehensive, in that it may not be sufficient to both allocate the loss and meet the cost of re-establishing a matched book (eg if the price established in an auction for the defaulter's positions is extremely negative, perhaps

[21] This is without prejudice to the reservation of some portion of assessment powers for replenishment purposes (see paragraph 3.7.2).

[22] Where amounts in default are ultimately recovered in the insolvency proceeding of the defaulting participant, such amounts could be distributed to participants who bore those losses.

due to illiquidity in the contracts). If the haircutting power is limited below the amount of VM owed it might also be insufficient to cover large losses and would need to be supplemented by other loss allocation tools. Moreover, a participant's positive position within a particular CCP may not be a perfect indicator of its relative ability to absorb a credit loss or liquidity shortfall. For example, the participant might have an equal (or larger) opposite position outside the CCP that it is hedging. As such, variation margin haircutting does not necessarily allocate losses to those who are best able to cope with them.

Initial margin haircutting by CCPs

3.5.19 In general, initial margin is provided to cover the obligations of the participant who posted it. In many jurisdictions, the legal or regulatory frameworks protect initial margin from being used to cover obligations other than those of that participant. Restrictions on or prohibition of the haircutting or mutualisation of initial margin as a recovery tool would not preclude, where legally permitted, either rules-based use of initial margin for liquidity purposes or the use of initial margin as collateral to secure a participant's obligation to the FMI to meet a cash call or other loss allocation, even if the liquidity need or loss allocation is triggered by the failure of another participant (see paragraph 3.5.13).

3.5.20 In other jurisdictions, some or all initial margin may, in the event of the CCP's insolvency, be exposed to the claims of creditors other than the participant who posted such initial margin. In such jurisdictions, initial margin haircutting may be used as a tool in recovery. Haircutting initial margin involves the CCP writing down initial margin provided by non-defaulting participants, who are then required to replenish the initial margin. The rules would need to specify that initial margin haircutting is permitted and how the size of the initial margin haircut on each participant would be determined. A simple option would be a pro rata haircut across participants, but it could also be position-based or activity-based. Where permitted in a legal jurisdiction, the effectiveness of haircutting in recovery may also depend upon the method by which the initial margin is posted (for example, whether the CCP has legal ownership or possession of the collateral as opposed to a security interest over the collateral held by the collateral giver or some third party).

3.5.21 Initial margin haircutting could be limited to the initial margin of direct participants. On the other hand, the tool could be applied to the margin of all participants (direct and indirect) providing this is consistent with the laws and regulations to which the CCP is subject and the rest of the CCP's rules. Like variation margin haircutting, even where the CCP applies margin haircuts only to direct participants, the contractual arrangements between direct participants and indirect participants may cause the haircutting to have an impact on indirect participants.

3.5.22 Initial margin is likely to constitute a very large pool of assets which would, if it can be used, provide a high degree of loss-absorbency. This loss-absorbency might be considered by market participants as contributing to a robust clearing system. The tool might be considered as effective, since it uses resources in the control of the CCP rather than relying on participants to meet a cash call by the CCP. Since the size of the loss faced by a participant would be capped at the size of their initial margin, this would not be an uncapped or uncontrollable exposure and participants would be able to determine their maximum loss from the use of this tool. This combination of effectiveness and high degree of loss absorbency could provide important incentives for participation in CCPs that include this tool in their recovery plans, helping the realisation of the G20 goal of expanding clearing of standardised swaps.

3.5.23 Any use of initial margin carries with it certain potential costs. Participants whose initial margin is consumed will be required to replenish it. The timeframe within which the consumed initial margin must be replaced raises important issues. Until it is replaced, the CCP is under-protected against future defaults. But if initial margin is required to be replaced immediately, this could cause a large liquidity strain during stressed conditions, which may have pro-cyclical effects, potentially leading to cascading defaults. Additionally, if the CCP arranges for initial margin not to be bankruptcy remote so that initial margin haircutting can be used during recovery, this would create capital charges for participants.

3.5.24 Moreover, and importantly, participants, in particular indirect participants, may be unable or unwilling to participate in a CCP if their initial margin is subject to loss for reasons other than their own default. By creating disincentives to participate in clearing, this approach could prevent the realisation of the G20 goal of expanding clearing of standardised swaps.

3.5.25 On the other hand, where the option of initial margin haircutting is either not legally permissible, or is permissible but not included in the CCP's rules, it will be important for the CCP to identify alternative ways of achieving an equivalent degree of loss absorbency – for example, through assessment rights.

3.6 Tools to address uncovered liquidity shortfalls

3.6.1 FMIs must meet the minimum liquidity requirements set out in Principle 7 of the PFMI using qualifying liquidity resources. FMIs may also have supplementary liquidity to help bolster their liquidity resources in certain scenarios. Nonetheless, uncovered liquidity shortfalls may crystalise in extreme circumstances and liquidity tools are needed to address this risk. The most reliable forms of liquidity are likely to be assets and arrangements that qualify as liquidity for meeting minimum requirements under Principle 7. In designing recovery plans for extreme scenarios, however, FMIs may need additional tools.

Obtain liquidity from third-party institutions

3.6.2 FMIs may have arrangements in place with third-party institutions to address uncovered liquidity shortfalls. Such tools may vary in their degree of reliability and pre-arrangement, and be similar to forms of liquidity discussed in Principle 7. Forms of liquidity that qualify to meet minimum requirements are likely to provide the strongest tools. Forms of liquidity that would qualify as supplementary liquidity may be useful in some scenarios, such as those where an FMI or market conditions are not highly stressed. However, these less reliable forms of liquidity will not represent sufficient tools to address uncovered shortfalls in highly stressed environments. Hence, recovery plans that contain such tools should also contain tools that will be effective in highly stressed environments.

Obtain liquidity from non-defaulting participants

3.6.3 Tools to obtain liquidity from non-defaulting participants form an important category of recovery tools for FMIs. Such tools can take different forms. One option could be to obtain liquidity only from those participants who are owed funds by the FMI, to the extent of those obligations. This could take the form of rules requiring such participants to provide a collateralised loan, a repo or a swap transaction. This tool has several advantages. As it would not require pay-ins from participants, it could be executed immediately and does not entail performance risk, and thus is reliable and timely. The tool is easiest to execute before outgoing payments have begun and is transparent as all terms and conditions should be clearly established under the FMI's rules. The size of potential obligations is measurable and controllable since it is based on the participant's position, which is directly controllable by the participant. Finally, participants are incentivised to monitor the FMI's liquidity risk-taking and management activities as well as their own individual liquidity risks in the system and to plan for their obligations should they materialise.

3.6.4 An alternative option would be ex-ante rules that permit the FMI to obtain liquidity more broadly from all participants rather than just those who are owed funds. This option, however, has some drawbacks because it would require pay-ins from some or all participants and thus entails an associated performance risk, raising questions of timeliness and reliability. Moreover, although measurable, the degree of control over the size of the potential obligation will depend on FMI rules (eg role of limits, degree of mutualisation, etc). Participants could thus be exposed to payment obligations that they might not be sufficiently able to control.

3.6.5 Both options could also take the form of uncollateralised lending from participants. However, collateralised lending may make disruptions easier to manage by liquidity providers since they could use collateral as part of their funding plans. In both cases, the FMI would need to perform an analysis of each participant's ability to absorb liquidity allocations of the magnitudes contemplated in order to be satisfied that use of the tool would not generate undue risk directly to participants or indirectly back to the FMI. These loans could be collateralised by assets that the FMI holds and is entitled to use.

3.7 Tools to replenish financial resources

3.7.1 An FMI will need to replenish its financial resources once uncovered losses caused by participant default have been allocated in order to be able to continue providing critical services. To that end, the FMI may either collect resources from its participants by means of cash calls and/or it may need to raise additional equity capital.

Cash calls on participants ("assessment power"):

3.7.2 Ex-ante assessment powers are one way to replenish resources. Depending on the rules of the FMI, where assessment powers are capped, it may be the case that use of such assessment powers to obtain resources to meet existing defaults would reduce the amount of contributions that can be assessed to replenish mutualised default resources that would be required for ongoing operations. In determining how to deploy a limited assessment power to meet a default, the FMI could consider whether a portion of the assessment power should be reserved. The FMI may choose to use position-based tools at its disposal (eg variation margin hair-cutting, contract tear-ups and forced allocations, or reductions in other credits owed) and to reserve a portion of mutualised funds that could be called through an assessment power for replenishment and restoration of mutualised default resources to the level and composition that applied prior to the default, or for the purpose of promoting continued operation.

3.8 Tools to allocate losses not related to participant default

3.8.1 An FMI will need to cover losses relating to general business, custody and investment, or operational risks which may cause an FMI to experience an extraordinary one-off loss or recurring losses. To that end, an FMI may need to recapitalise or have put in place explicit insurance or indemnity agreements.

Investment risk

3.8.2 An FMI should have comprehensive arrangements in place to allocate losses from the investment risk it incurs as a result of its clearing and settlement activity, for example risks arising from investment of participants' cash margins or loss of participant funds while held by the FMI at payment or settlement banks.

Recapitalisation

3.8.3 There may be circumstances in an FMI recovery where the FMI needs to obtain resources that exceed those available in the existing capital structure, including cases where the FMI requires such resources to replenish its resources to continue systemically important operations. In considering how, and from whom, such resources can be acquired, the tools available to the FMI may be affected by limits to the liability of both shareholders and participants in an FMI.

3.8.4 The appropriate means for capital raising will necessarily be affected by the existing ownership structure of the FMI. Some FMIs may be user-owned, others may be owned by private investors, and others may be owned by public shareholders. Where the ownership structure supports it, one

appropriate means for raising capital could be for an FMI to develop, ex ante, arrangements with existing owners regarding the recapitalisation of the FMI so it can continue providing critical services. The arrangements could specify how any recapitalisation would proceed, including commitments to contribute (if any), and terms associated with any new capital issued.

3.8.5 Another appropriate means for capital raising could be for an FMI to develop, ex ante, contingency plans to structure optional contributions for such recapitalisation. In such circumstances, it may be appropriate to consider whether such optional contributors should be compensated with an ownership interest in the FMI commensurate with the level of "new value" contributed. Depending on how it is implemented, this would imply the dilution or subordination of the interests of existing owners who do not contribute. This could incentivise participation in a capital raising exercise by permitting contributing institutions to benefit from any upside potential from the revitalised FMI. Contributors of new value may also obtain voting power.

3.8.6 While it may not be appropriate for an FMI to rely fully on any one means of capital raising, having the mechanisms to facilitate a recapitalisation may expedite capital raising in a recovery scenario.

Explicit insurance (eg from a third party) or indemnity agreements (eg from a parent, owners or participants)

3.8.7 Insurance or indemnity agreements may be an effective way of addressing the impact of specific business and operational losses. However the timeliness and reliability of such arrangements would be subject to a number of factors including the lead-time required for having a claim processed and paid (in particular if there might be a challenge as to the validity of the claim or indemnification). Use of this tool would result in replenishment of the FMI's financial resources, although an FMI is very likely to need to take recovery measures to address the root cause of its financial distress in addition to replenishment of financial resources.

3.8.8 Providers of insurance facilities typically impose a maximum limit on their exposure to individual insurable events, and the mechanics of how losses are to be determined would typically be set out in an insurance contract. An indemnity arrangement might also contain these features.

3.8.9 Providers of insurance plan to be able to withstand the impact of the payment of claims and are typically regulated entities. An indemnity arrangement could require the provider to provide significant financial resources in what might be times of stress and therefore such a tool could cause the indemnity provider to experience solvency and liquidity strains in a procyclical manner. However, it would always be open for an indemnity provider to establish the maximum amount of additional support that the provider is willing to provide to the FMI.

3.9 Tools for CCPs to re-establish a matched book

3.9.1 After a participant defaults, a CCP will need to re-establish a matched book of obligations, stemming further losses. The CCP may, through its own staff, with the aid of personnel seconded by participants, or other third party personnel, enter into liquidating or risk-neutralising transactions to mitigate the market risk of the defaulter's positions, or may auction portions or all of the defaulters' portfolio to surviving participants. If the CCP is unable to offset the defaulter's positions, within the CCP's recovery resources, through voluntary means, it may need to take action through involuntary means (albeit based on ex-ante agreements), such as forced-allocation or tear-up.

3.9.2 Each of the tools discussed below to return the CCP to a matched book carries drawbacks and risks. But a CCP should identify in its rules which one or more of these options it would use in order to ensure that it has the capacity to return to a matched book and remove the risk of further losses from unmatched positions.

Incentivise acceptance of unmatched contracts

3.9.3 To deal with a defaulter's outstanding positions, a CCP should auction these to direct participants or to third parties who could clear such positions through direct participants. The CCP's rules could provide incentives for successful bidders on unmatched contracts. The method of allocation of losses among participants could be set out ex ante to provide incentives for competitive bidding, for example "juniorising" (that is, using first) the mutualised default fund contributions of participants (if these have not been exhausted in meeting losses caused by a default) that are not successful bidders in auctions of unmatched contracts.

3.9.4 The use of such incentives would tend to mitigate the problem of unsuccessful auctions but does not eliminate it. It is thus not comprehensive by itself and may not be fully effective. If participants expect that the entirety of the default resources will be consumed, they may not be influenced by their default fund contributions being junior or senior. The effectiveness of the tool depends on the participants' evaluation of whether senior contributions to the default resources will be used. The method is transparent. The tool encourages competitive bidding in auctions for the defaulter's positions, thus assisting with default management. The tool does not affect a participant's liability, only the likelihood that the liability will be incurred.

Forced allocation of contracts

3.9.5 To the extent the CCP has positions remaining that it cannot allocate through voluntary means at a price within the CCP's available resources, it could forcibly allocate those positions to non-defaulting participants at a price determined by the CCP. The method of allocation should be set out ex ante, for example focusing on direct participants that hold positions related to or opposite the unmatched positions, or allocating more positions to participants who have made fewer successful bids in the voluntary auctions.

3.9.6 Appropriate incentive mechanisms could be built into a forced allocation tool. For example, if participants are more likely to acquire forcefully allocated positions if they do not participate competitively in auctions or other aspects of the default management process, then the tool should incentivise participants to assist with default management.

3.9.7 Forced allocation is comprehensive, in that it fully allocates unmatched positions. It should be effective, at least initially, since it does not rely on participants to 'pay up,' in the first instance (ie until and unless the allocated positions incur losses).

3.9.8 Forced allocations could have different effects on participants depending on how they are structured. Allocations that are more understandable ex ante and more closely related to participants' contracts or trading activities are relatively more manageable and controllable. Allocations that are less understandable ex ante and less closely related to participants' contracts or trading activities are relatively less manageable and controllable.

3.9.9 In some cases, participants could be required to take on a set of contracts which they may not be able to measure ex ante and may expose them to more risk than they are able to manage particularly in volatile market conditions. Moreover, depending on market liquidity and price volatility, participants' capacity to reduce unwanted positions may be inhibited while losses accrue. Conceivably, such risks may concentrate exposures on a subset of participants, potentially reducing the financial system's ability to bear future losses.

3.9.10 However, forcibly allocating a small number of positions could result in less disruption than the termination (or close out) of all contracts and positions (ie complete tear up).

Contract termination: tear up

3.9.11 The CCP could terminate some or all open positions in order to return to a matched book and stem further losses. A price would be established upon termination, eg at the last available marked to

market price, and, to the extent resources are insufficient to permit payment of mark-to-market gains, payments due to participants would be reduced pro rata (ie variation margin haircutting). The termination or allocation could be (a) of all open contracts in a particular CCP ("complete tear-up"), (b) of all open positions in a particular service (eg all CDS contracts, but not IRS contracts), (c) of only those contracts needed to offset the defaulted contracts, and/or (d) contract tear ups subject to appropriate safeguards to minimise impact on netting sets. "Contract termination" with the "break up" of netting sets or hedged positions entail an element of "loss allocation" and "change in position", so their implications should be carefully assessed.

3.9.12 Complete tear-up would, by its nature, apply to the positions of all direct and indirect participants. Partial tear-up could be applied to the positions of direct participants, or could theoretically be extended to the positions of indirect participants, depending on the arrangements between direct and indirect participants, the CCP's rules and subject to compatibility with statutory or regulatory requirements. The effect of either complete or partial tear up on clients would depend on the participants' arrangements with their clients.

3.9.13 Complete tear-up is comprehensive, in that all positions, matched or unmatched, would be terminated. The tool is effective, since it does not require additional payments from participants.

3.9.14 Complete tear-up may expose participants to replacement cost risk at the point of termination. A participant's exposure is a function of its own positions. Thus, exposure to the CCP would be controllable.

3.9.15 However, the use of complete tear-up will cause significant disruption to the products or markets where contracts are terminated. Hedges of positions outside the CCP would be lost and participants' attempts to replace those positions or otherwise manage exposures would potentially exacerbate already volatile market conditions. Moreover, as a complete tear-up implies a termination of the contracts before their original termination date, one may question whether this tools achieves the objective of continuity of the key services provided by the CCP. As such conditions may trigger contagion and provoke further defaults use of complete tear up should be avoided to the extent practicable. The use or imminent use of such a tool may be a trigger for resolution.

3.9.16 Partial tear-up is comprehensive in restoring a balanced position. The tool is effective, since it does not require additional payments from participants.

3.9.17 Partial tear-up could have different effects on participants depending on how it is structured. Partial tear-ups that are more understandable ex ante and more closely related to participants' trading activities are relatively more manageable and controllable. In general, tear-up procedures that are less understandable ex ante and less closely related to participants' trading activities are relatively less manageable and controllable.

3.9.18 In some cases, participants could be left with a set of contracts with risks that they may not be able to measure ex ante and that may expose them to more risk than they are able to manage, particularly in volatile market conditions.

3.9.19 Partial tear-up may expose participants to replacement cost risk at the point of termination. Moreover, depending on market liquidity and price volatility, participants capacity to address their altered balance of positions may be inhibited while losses accrue. Conceivably, such risks may concentrate exposures on a subset of participants, potentially reducing the financial system's ability to bear future loss.

3.9.20 Tear-up, whether partial or complete, may affect incentives for participation in an auction.

3.9.21 A CCP whose rules include the availability of partial tear-up may create disincentives for participation among participants who, for risk management and/or regulatory reasons, are unwilling or unable to accept a model in which a hedged position may, by action of the CCP, be changed into a directional positions, in a manner that creates risks that the participant cannot effectively control ex ante

other than by exiting the CCP. As a consequence, partial tear up may also have implications for the reliance on and management of net exposures.

3.9.22 However, partial tear-up of a small number of contracts could result in less disruption than complete tear-up of all contracts. Similar to a forced allocation of contracts, this can create an incentive for market participants to choose and stay at a CCP which does not have the risk of the disruption associated with complete tear-up.

Contractual versus voluntary tools to achieve a matched book

3.9.23 In order for a recovery plan to be comprehensive, it should include contractual tools pursuant to which the CCP may, on a mandatory basis, re-establish a matched book. Such mandatory tools necessarily involve either disruption to netting sets, compulsory allocation of unmatched positions or full tear up.

3.9.24 In contrast to the use of mandatory tools, voluntary or auction-based sale or replacement of unmatched positions is likely to lead to a far more desirable outcome. Accordingly, to maximise the chances of a successful voluntary or auction-based approach, the CCP should make use of the tools described in previous sections, such as variation margin haircutting and assessment rights, so that it has significant additional resources over and above its pre-funded default resources before it is forced to employ mandatory tools such as tear-up of contracts or forced allocation.