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Recovery of financial market infrastructures

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Executive summary

The purpose of this report is to provide guidance for financial market infrastructures (FMIs) and authorities on the development of recovery plans. All systemically important FMIs should have a comprehensive and effective recovery plan, as required by the CPSS-IOSCO *Principles for financial market infrastructures* (PFMI), because the disorderly failure of such an FMI 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 PFMI, but rather to provide supplemental guidance on, and a menu of tools for, observance of the PFMI. The report is also consistent with the *Key attributes of effective resolution regimes for financial institutions* of the Financial Stability Board (FSB).

The report provides guidance on both the recovery planning process and the content of recovery plans. It provides an overview of some of the tools that an FMI may include in its recovery plan, including a discussion of scenarios that may trigger the use of recovery tools and characteristics of appropriate recovery tools in the context of such scenarios. The report considers recovery tools that fall into five categories: tools to allocate uncovered losses caused by participant default; tools to address uncovered liquidity shortfalls; tools to replenish financial resources; tools for a central counterparty (CCP) to re-establish a matched book; and tools to allocate losses not related to participant default. Tools may be used in different combinations or sequences by different FMIs and under different scenarios. The inclusion of a tool in the report does not mean that it should necessarily be used by an FMI. Moreover, some jurisdictions may not allow FMIs to use all the tools listed in this report, or may limit certain tools to specific types of FMIs. Moreover, an FMI may have or seek to design additional or alternative tools to include in its recovery plan.

An FMI should have a set of recovery tools that is comprehensive and effective in allowing the FMI to, where relevant, allocate any uncovered losses and cover liquidity shortfalls. The set of tools should also include plausible means of addressing unbalanced positions and replenishing financial resources, including the FMI's own capital, in order to continue to provide critical services. Each tool should be effective in the sense of being timely, reliable and having a strong legal basis. The tools should be transparent and designed to allow those who would bear losses and liquidity shortfalls to measure manage and control their potential exposure. The tools should create appropriate incentives for the FMI's owners, participants and other relevant stakeholders to control the amount of risk that they bring to or incur in the system, monitor the FMI's risk-taking and risk-management activities, and assist in the FMI's default management process. The tools should also be designed to minimise the negative impact on direct and indirect participants and the financial system more broadly.

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

- An FMI should identify the services it provides that are critical. This should be done in close coordination with the relevant authorities and in consultation with relevant stakeholders. The recovery plan should also identify the stress scenarios that may prevent the FMI from being able to provide its critical services as a going concern, and the triggers for implementing the recovery plan.
- The recovery plan should include a set of recovery tools that is comprehensive and effective (in terms of reliability, timeliness and legal basis). The tools should be transparent and allow those who would bear losses and liquidity shortfalls to measure, manage and control their potential exposure. The set of tools should also create appropriate incentives and be designed to minimise negative impacts.
- The interests of all stakeholders who are likely to be affected by the recovery plan should be considered by an FMI when its plan is being developed as well as when it is implemented. As opinions among stakeholders are likely to differ, the FMI should have clear processes for

identifying and appropriately managing the diversity of stakeholder views and any conflicts of interest between stakeholders and the FMI.

- The recovery plan and tools should take into account any constraints potentially imposed by domestic or foreign laws or regulations.
- Effective implementation of the recovery plan requires that tools to allocate uncovered losses and liquidity shortfalls and, to the extent practicable, other recovery tools are established ex ante and are enforceable.
- Even where an FMI has ex ante agreement that a tool may be used, a balance may need to be struck between its automatic application in a given situation (which increases transparency and predictability) and discretion by the FMI to use its judgment (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.
- An FMI should have in its recovery plan ex ante, rules-based tools that fully allocate, for example through loss allocations based on patrticipants' positions, any losses caused by participant default that are not otherwise covered.
- An FMI should have in its recovery plan ex ante, rules-based tools that fully allocate any liquidity shortfalls, whether caused by participant default or otherwise, that are not covered by available resources. Such tools should include, as necessary, rules-based funding from participants to whom funds are owed.
- An FMI should have tools to replenish any financial resources it may employ in a stress event. These tools may include collecting resources from its participants by means of cash calls and raising additional equity capital.
- A CCP should have additional tools in place that allow it to re-establish a matched book. It should consider establishing ex ante incentives for direct participants, indirect participants or third parties to support and to participate in any market-based sale, auction or buy-in. However, the CCP should also have a mandatory, ex ante agreed mechanism to re-establish a matched book in case such voluntary efforts fail.
- To enable it to recover from losses from general business, custody and investment risks, an FMI needs to have both sufficient capital and a viable plan to recapitalise in circumstances where the FMI's capital is used to absorb such losses; an FMI should also consider having explicit insurance or indemnity agreements to cover such losses. In particular, an FMI should have comprehensive arrangements in place to allocate losses from the investment risk it incurs as a result of its payment,clearing and settlement activity.
- An FMI will require, in addition to plans to recover from a financial shortfall, procedures to identify and address any underlying structural weaknesses that led to the shortfall.

1 Introduction

1.1 Purpose of the report

1.1.1 The purpose of this report is to provide guidance for 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 loss, liquidity shortfall or capital inadequacy, whether arising from participant default or other causes (such as business, operational or other structural weaknesses), including actions to replenish any depleted pre-funded financial resources and liquidity arrangements, as necessary to maintain the FMI's viability as a going concern and the continued provision of critical services.

1.1.2 The recovery tools described in this report can be used in different combinations or sequences by different FMIs. Careful consideration should be given to the appropriateness of a particular tool given relevant factors such as the type of FMI and the services it provides, the nature of the relevant products and markets, and the impact of the use of the tool on stakeholders (including direct and indirect participants and any linked FMIs). Depending on the circumstances, these factors may lead to the conclusion that the availability or use of certain tools will have too great an adverse impact on financial stability. The inclusion of a tool in the report does not mean that it should necessarily be used by an FMI. Moreover, some jurisdictions may not allow FMIs to use all tools listed in this report, or may limit certain tools to specific types of FMIs.

1.1.3 The triggers for entry into resolution may vary from jurisdiction to jurisdiction. Some tools may be used for either recovery or resolution. However, some jurisdictions may reserve certain tools for exclusive use by the resolution authority.

1.1.4 Nevertheless, if a loss or liquidity shortfall occurs, it will ultimately be allocated in some manner to owners, participants and, potentially, other creditors. If the recovery plan proves 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 the recovery plan is designed to allocate losses and liquidity shortfalls fully.

1.1.5 The development and, if necessary, implementation of a recovery plan is the responsibility of an FMI itself. 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. In addition to providing guidance for FMIs, this report therefore also provides guidance to the relevant authorities in carrying out their responsibilities associated with the development and implementation of recovery plans and tools.

1.1.6 In April 2012, the Committee on Payment and Settlement Systems (CPSS)[1] 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 CPMI 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."[2] Consequently, the PFMI requires robust risk management

[1] The Committee on Payment and Settlement Systems (CPSS) changed its name to the Committee on Payments and Market Infrastructures (CPMI) on 1 September 2014. Please note that references to reports published before that date use the Committee's old name.

[2] CPSS-IOSCO, *Principles for financial market infrastructures*, April 2012, p 10.

appropriate to the critical role played by FMIs in preserving financial stability, including plans for recovery.

1.1.7. This report is intended to provide supplemental guidance to the principles and discussion in the PFMI regarding recovery planning.[3] It is not intended to create additional requirements for FMIs, or authorities, beyond those set out in the PFMI.

1.1.8 A draft of this report was issued for consultation in August 2013. This final version of the report has been revised in the light of the comments received during the consultation, which are published on the BIS and IOSCO websites.[4]

1.2 Content of the report

1.2.1 Section 2 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 considering the various scenarios that may require use of recovery tools and setting out characteristics of an appropriate set of tools to meet the recovery objectives. Section 4 discusses a range of specific recovery tools that deal with financial stresses to an FMI.

[3] It is also consistent with the FSB's *Key attributes of effective resolution regimes for financial institutions* (the Key Attributes) (October 2014).

[4] 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 FMIs in circumstances where recovery is no longer feasible. Many of the commentators on that first consultative report requested more guidance on which recovery tools would be appropriate for different types of FMIs in different circumstances. This report on *Recovery of financial market infrastructures* provides that guidance. Aspects of the consultation report concerning FMI resolution have been included in Appendix II, Annex 1 to the Key Attributes.

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 their 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 or liquidity shortfalls for the FMI. General business risk, including the financial consequences of operational and legal risks, could lead to unanticipated extraordinary one-off or ongoing losses or liquidity shortfalls. The realisation of these risks has the potential to result in an FMI's financial failure.

The importance of maintaining critical services

2.1.2 Systemically important FMIs play an essential role in the financial system, and the disorderly failure of such an FMI 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 would be substantial practical problems in transferring these critical services rapidly to another FMI. Indeed, 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 in 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 vital to 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 an effective plan to enable it to continue to provide its critical services if these circumstances were to occur. The recovery plan should address circumstances that may give rise to any uncovered loss, liquidity shortfall or capital inadequacy, as well as any structural weaknesses that these circumstances reveal. The recovery plan should also address the need to replenish any depleted pre-funded financial resources and liquidity arrangements so that the FMI can remain viable as a going concern and continue to provide its critical services. The existence of the recovery plan further enhances the resilience of the FMI and will provide confidence that the FMI will be able to function effectively even in extreme circumstances.

Recovery versus orderly wind-down

2.2.2 Given the systemic importance of FMIs, it is necessary that each FMI have a comprehensive and effective recovery plan designed to permit the FMI to continue to provide its critical services. However, where such a plan proves, in a particular circumstance, to be ineffective, it is important that the FMI have a plan to wind down in an orderly manner. A plan for an orderly wind-down is not a substitute for having a comprehensive and effective recovery plan.

Recovery and resolution

2.2.3 As indicated in the Key Attributes, entry into resolution should be possible, subject to determination by the relevant authorities, if the recovery plan has failed to return the FMI to viability or has not been implemented in a timely manner, or if the relevant regulator, oversight, supervisory or resolution authority determines that, even though the plan may not yet have been fully implemented or exhausted, recovery measures will not be sufficient to return the FMI to viability or will otherwise compromise financial stability. Therefore, even if a jurisdiction and its FMIs are in full observance of the PFMI, then as set out in the Key Attributes, the FMIs should be subject to a resolution regime that applies the objectives and provisions of the Key Attributes in a manner appropriate to FMIs and their critical role in financial markets.[5] While, as noted above, the implementation of the recovery plan is the responsibility of the FMI itself, which accordingly also has to have the power to take the necessary decisions, under resolution that responsibility and power will pass to the resolution authority instead. 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 or liquidity shortfall allocation rules where any such rules have not been implemented before entry into resolution.

2.3 The process of recovery planning

Purpose

2.3.1 The purpose of a recovery plan is to provide the information and procedures necessary to allow an FMI to effect recovery such that it can continue to provide its critical services when its viability as a going concern is threatened. The plan enables the FMI, its participants and other relevant stakeholders to prepare for such extreme circumstances, increases the probability that the most effective tools to deal with a specific stress will be used and reduces the risk that the effectiveness of recovery actions will be hindered by uncertainty about which tools will be used. The recovery plan should be formulated on the presumption that any uncovered loss or liquidity shortfall will be borne by the FMI's, its owners' and its participants' own resources and provide an effective means of achieving a matched book, where applicable, and a means of replenishing financial resources. Accordingly, the recovery plan should not assume any extraordinary form of state or central bank support. The recovery plan will also assist resolution authorities in preparing and executing their resolution plans for the FMI.[6]

Coverage

2.3.2 All systemically important FMIs should have a comprehensive and effective recovery plan, as required by the PFMI.[7] The guidance contained in this report expands on the PFMI and is consistent with

[5] See Key Attribute 1.2.

[6] Appendix I, Annex 4 of the Key Attributes covers the relationship between recovery and resolution planning.

[7] See paragraph 1.20 of the PFMI on the systemic importance of FMIs. See paragraph 1.23 of the PFMI on the applicability of the PFMI to FMIs operated by central banks.

the Key Attributes.[8] In general, the guidance applies regardless of an FMI's licensing status (for example, whether or not it is licensed as a bank).

Governance

2.3.3 The 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 or equivalent governing body. The FMI should have an effective governance structure and sufficient resources to support the recovery planning process. This includes clearly defining the responsibilities of board members, senior executives and business units, and identifying a senior executive responsible for ensuring that the FMI observes recovery planning requirements and that recovery planning is integrated into the FMI's overall governance processes.

2.3.4 Consistent with Principle 2 of the PFMI, the interests of all stakeholders who are likely to be affected by the recovery plan should be considered by the FMI's board when the plan is being developed and implemented.[9] It is particularly important that those who would bear losses or liquidity shortfalls are appropriately involved in the formation of the plan. Mechanisms for involving relevant stakeholders (which may include indirect participants and linked FMIs) in the board's decision-making process may include consultation processes as well as representation on the board or on risk or other relevant committees. As opinions among stakeholders are likely to differ, the FMI should have clear processes for identifying and appropriately managing the diversity of stakeholder views and any conflicts of interest between stakeholders and the FMI.

Powers and enforceability

2.3.5 Effective implementation of recovery plans requires that tools to allocate uncovered losses and liquidity shortfalls and, to the extent practicable, other recovery tools are established ex ante and are enforceable. The FMI should assess the legal enforceability of its plan, 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 allowed under the applicable legal framework or may be reserved for exclusive use by resolution authorities. In every case, however, it is important that a jurisdiction's laws permit the adoption of recovery tools that allocate losses and liquidity shortfalls in full.

Judgment in the use of tools

2.3.6 Closely related to powers and enforceability is 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, a balance may need to be struck between automaticity and discretion. On the one hand, making the use of the tool automatic in a given situation increases transparency and predictability for participants, owners and third parties about the action that will be taken. On the other hand, if the FMI has discretion to exercise judgment about the tool's use or timing, this may enable a better decision to be taken about the use of the tool in the 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 makes it more likely that an exercise of judgment is consistent with the broader objectives of the recovery plan. An FMI should also have the appropriate procedures to

[8] 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.

[9] See Key Consideration 7 of Principle 2 of the PFMI.

minimise conflicts of interest when it exercises discretion. In addition, authorities should be kept informed of the decisions made by the FMI in its discretion to exercise judgment.

2.3.7 In accordance with the transparency obligations in Principle 23 of the PFMI, an FMI should disclose, to those affected by the recovery plan, sufficient information about the plan (including the degree of the FMI's discretion to exercise judgment) to enable them to understand clearly how the allocation of the losses and liquidity shortfalls would be determined.

Testing and review

2.3.8 To help ensure that the recovery plan can be implemented effectively, an FMI should test and review the plan, for example by carrying out periodic simulation and scenario exercises. Such testing and review should occur at least annually as well as following changes to the FMI's planning, rules, procedures or services that would materially affect the recovery plan. 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.[10] The FMI should update its recovery plan as needed following the completion of each test and review.

Implementation

2.3.9 An FMI's governance arrangements should provide for timely and effective implementation of its recovery plan, including documented decision-making processes in a crisis. An FMI should also identify and provide to stakeholders on a timely basis the information they need with respect to the FMI's implementation of the plan. This includes both the information needed ex ante to enable stakeholders to prepare for implementation and the information needed during the execution of the recovery plan and to enable the stakeholders to mitigate the plan's effects on themselves. Such stakeholders include the FMI's owners, direct and indirect participants and others involved in the recovery plan.

2.4 The content of recovery plans

High-level summary

2.4.1 A recovery plan should include a high-level summary that provides an overview of the plan and how it 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.

Critical services

2.4.2 An FMI should identify those services it provides that are critical. "Critical" refers to the importance of the service to the FMI's participants and other FMIs, and to the smooth functioning of the markets the FMI serves and, in particular, the maintenance of financial stability. The purpose of identifying critical services is to focus the recovery plan on the FMI's ability to continue to provide these services on an ongoing basis, even when it comes under extreme stress. The identification of critical services should be done in close coordination with the relevant authorities and in consultation with relevant stakeholders.

2.4.3 In general, a systemically important FMI's payment, clearing, settlement or recording functions will be regarded as critical. The failure of an FMI to provide a critical service would be likely to have a material negative impact on participants or third parties, give rise to contagion and undermine general confidence in the markets the FMI serves. 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

[10] See also Key Attribute 11.10.

entity) and whether users of a potentially failed service can practicably and effectively switch to an alternative service.[11]

2.4.4 If an FMI provides services ancillary to its critical services, it should determine whether the recovery plan needs to provide for the continuity of these services (for example, where a critical service cannot be provided effectively without the ancillary service).[12]

Stress scenarios

2.4.5 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.[13] 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 liquidity shortfalls,[14] or the realisation of investment losses or liquidity shortfalls (for example, 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 a critical function for the FMI (for example, the failure of a settlement bank, liquidity provider or other service provider). Where the FMI is part of a group, it may be at risk from circumstances affecting other entities in the group. Where the FMI has links with other FMIs, it may be at risk from failures at those FMIs. The underlying assumptions should be such that the scenarios are 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

2.4.6 An FMI should define the criteria (both quantitative and qualitative) that will trigger the implementation of part or all of the recovery plan. This will help avoid undue delays in the implementation of the plan.

2.4.7 In some cases the triggers will be obvious. For example, in the case of participant default, the recovery plan 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 default-related shortfalls or when it has become unlikely that the pre-funded financial resources or liquidity arrangements will be sufficient.

2.4.8 In other cases, judgment may be needed regarding how to devise appropriate triggers. For example, chronic or extraordinary losses from general business risks that threaten to impair the FMI's capital may indicate that the scale of a problem has become sufficiently serious that the recovery plan may need to be implemented. These triggers should lead to a pre-determined information-sharing 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

[11] 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.

[12] Note that even if a specific service is judged not to be critical, a systemically important FMI needs to take account of the possibility that losses or liquidity shortfalls relating to the provision of that non-critical service could threaten its viability and thus necessitate implementation of its recovery plan so that it can continue to provide those services that are judged to be critical. An FMI needs to have a recovery plan that covers all the scenarios that could threaten its viability. However, tools in the plan relating to a non-critical service may be different from tools relating to a critical service, eg in terms of who bears the losses or liquidity shortfalls.

[13] See also Key Attribute 11.5.

[14] These losses and liquidity shortfalls will be relevant to all FMIs regardless of whether they are exposed to risks associated with participant default.

sufficient time for the plan to be implemented. Implementation will typically take place after discussion with the relevant authorities.[15]

Recovery tools

2.4.9 An FMI 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. The recovery plan should include tools to cover shortfalls from the stress scenarios identified by the FMI – 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 or liquidity shortfalls, in particular from those general business risks that may materialise more slowly. The FMI may also need tools to increase its capital. Possible recovery tools are discussed in Sections 3 and 4.

Structural weaknesses

2.4.10 Recovery concerns financial shortfalls that pose a threat to the FMI's viability and financial strength. However, in most cases the FMI will not only need to recover from the financial shortfall itself but will also need to identify and address the underlying cause of the problem if it is to continue operating as a going concern. The recovery action taken will depend on the specific stress scenario that led to the problem.

2.4.11 If the financial problem that triggers recovery 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 that could lead to a financial shortfall that requires the implementation of the recovery plan, an FMI should carry out a strategic analysis.[16] 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 the PFMI). For example, an FMI may need to obtain approvals from authorities or 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 affect another FMI. 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

[15] 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.

[16] Cf Key Attributes, Appendix I, Annex 4, paragraph 2.3.

FMIs. The recovery plan of each FMI should address the allocation of uncovered losses and liquidity shortfalls, taking into account any impact that implementation of recovery tools may have on linked FMIs and any impact that linked FMIs may have on the effectiveness of such tools.

2.5 The 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.[17]

Assessment of recovery plans

2.5.2 An authority with responsibility for an FMI should periodically assess the adequacy of the FMI's recovery plan (taking into account the risk profiles of both the FMI and market participants). Where deficiencies exist, the authority should have and should employ the necessary powers to ensure the FMI corrects them. Further, to the extent possible, the relevant authorities should also consider the potential impact on direct and indirect participants, financial markets served by the FMI and the financial system more broadly when assessing the appropriateness of the tools included in, and the overall adequacy of, the FMI's recovery plan.

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. These authorities should also coordinate with other relevant authorities, such as the relevant resolution authorities, to ensure consistency between recovery and resolution plans, and, as appropriate, the supervisors of the FMI's participants.

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 an FMI's recovery plan and be kept informed of progress in implementing the plan 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 plan needs to be implemented, the relevant regulatory, supervisory and oversight authorities should oversee that implementation in a manner consistent with their respective responsibilities. Coordination and information-sharing between all relevant parties are critical to the successful execution of the FMI's plan.

2.5.7 While responsibility for implementing its recovery plan lies with the FMI itself, 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 conflicts of interest, uncontrollable external factors and human error could result in inadequate execution. In such cases, the relevant authorities should, consistent with their respective responsibilities, have the necessary powers to require implementation by the FMI of the recovery measures included in its plan and to drive effective 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.

[17] See Section 4.0 of the PFMI.

3 Recovery tools: general considerations

3.1 Introduction

3.1.1 This section provides some general considerations that should be taken into account when designing and adopting recovery tools. It considers the various risk categories and failure scenarios that may require the use of recovery tools and sets out the characteristics of an appropriate set of tools to meet an FMI's recovery objectives.

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

3.2.1 FMIs can be exposed to legal, credit, liquidity, general business, custody, investment and operational risks.[18] Not all FMIs are exposed to all of these risk categories equally or in the same manner. Most importantly, not all FMIs assume credit risk.[19] The manifestation of the risks may have different causes and may also result in different types of stress scenarios. For example, credit or liquidity risks may result from the default of a participant and, if not adequately addressed, could result in the failure of an FMI over a short time frame. Similarly, the crystallisation of investment risks may also have sudden effects requiring the immediate implementation of recovery tools, for example in the event of a failure of a cash settlement agent or treasury counterparty. The incidence of business losses 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 FMIs (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.[20]

Uncovered liquidity shortfalls

3.2.3 Liquidity risk is the risk that a counterparty, whether a participant or other entity, will have insufficient funds to meet its financial obligations when due, even though it may be able to do so in the future. Liquidity 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 (eg because of the non-performance of a liquidity provider). Although credit and liquidity risks are distinct, 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 needed for addressing and allocating uncovered liquidity shortfalls, in accordance with Key Consideration 10 of Principle 7 of the PFMI.

[18] Definitions in this section are taken from the PFMI (Annex H).

[19] 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.

[20] See also paragraph 3.4.25 of the PFMI.

Losses from custody and investment risks

3.2.4 Investment risk is the financial risk 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, at the FMI's own risk, collateral posted by its participants in instruments that were subject to market or credit risk, and such risks materialised, financial difficulties could arise and the FMI might be unable 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 subcustodian's) insolvency, negligence, fraud, poor administration or inadequate record-keeping.

Losses from general business risk

3.2.5 General business risk refers to the financial risks 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. Any loss resulting from business risk may materialise as an extraordinary one-off loss or as a continuing loss, and thus could play out either in a very short period of time or over a longer period. A failure to manage general business risk could result in disruption to an FMI's business operations or threaten its long-run viability as a going concern.

3.3 Characteristics of recovery tools

3.3.1 The appropriateness of a given recovery tool or set of tools will vary based on particular FMIs and their individual circumstances. In some cases, a single recovery tool may be sufficient to achieve recovery of the FMI; however, in many cases, an FMI will probably need to use a combination of tools to achieve such an outcome. The following characteristics will help an FMI evaluate the strengths and weaknesses of tools so that it can choose the set most appropriate for each relevant recovery scenario, including the sequence in which they should be used.

(i) *Comprehensive*. The set of tools should comprehensively address how the FMI would continue to provide critical services in all relevant scenarios.

(ii) *Effective*. Each tool should be reliable, timely, and have a strong legal basis.

(iii) *Transparent, measurable, manageable and controllable*. Tools should be transparent and designed to allow those who would bear losses and liquidity shortfalls to measure, manage and control their potential losses and liquidity shortfalls.

(iv) *Create appropriate incentives*. The tools should create appropriate incentives for the FMI's owners, direct and indirect participants, and other relevant stakeholders.

(v) *Minimise negative impact*. The tools should be designed to minimise the negative impact on direct and indirect participants and the financial system more broadly.

3.3.2 An FMI should endeavour to develop a set of tools, including the sequence in which they would be used, that exhibits these characteristics to the greatest extent possible. However, because no set of tools may fully satisfy all the characteristics, an FMI will need to determine which set achieves the best trade-off.

Comprehensive

3.3.3 Once a loss or liquidity shortfall 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 tool it will necessarily be allocated by another. If an FMI's rules do not comprehensively address financial shortfalls, the FMI may be forced to struggle through the crisis in a disorderly manner when all pre-arranged tools are exhausted, which may destabilise financial markets as a whole and necessitate entry into resolution or insolvency.

3.3.4 The set of tools should address comprehensively any uncovered credit loss or liquidity shortfall, ensure re-establishment of a matched book and enable replenishment of the FMI's financial resources, including its own capital, in order to continue to provide critical services. The set of 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.

Effective

3.3.5 Effective tools are reliable, timely, and have a sound legal basis. 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. Further, an FMI should take into account the extent to which participants, owners and third parties would have sufficient resources to meet their potential obligations when considering the reliability of a tool or set of tools. The tools should provide the FMI with the required resources in a timely manner. When developing recovery tools, an FMI should consider the trade-offs between tools that require new resources to be collected from participants (eg cash calls) and those that do not (eg variation margin haircutting). Lastly, tools should be consistent with the FMI's rules, membership agreements, contracts, and the regulatory and legal frameworks in all relevant jurisdictions.

Transparent, measureable, manageable and controllable

3.3.6 Tools should be transparent and designed to allow those who would bear losses and liquidity shortfalls to measure, manage and control their potential losses and liquidity shortfalls.[21] A loss or liquidity shortfall is measurable to the extent that those who bear it are able to understand clearly ex ante how it would be allocated to them and what the potential size of their allocation would be under each default scenario. A loss or liquidity shortfall is manageable to the extent that those who bear it are able to absorb it without endangering their own financial viability. A loss or liquidity shortfall is controllable to the extent that those who bear it are able to affect by their behaviour the extent of their exposure to it.

Create appropriate incentives

3.3.7 The recovery tools should create appropriate incentives for an FMI's owners, participants and, where relevant, other stakeholders to (i) control the amount of risk that they bring to or incur in the system, (ii) monitor the FMI's risk-taking and risk management activities, and (iii) assist in the FMI's default management process.

3.3.8 In line with Principle 3 of the PFMI, an FMI should create incentives for direct and indirect participants to manage and contain risks they pose to the FMI. Any involvement by participants in loss or liquidity shortfall sharing may provide some incentive for them to reduce the risks created by their own positions and activity. Using recovery tools where participants' losses or liquidity shortfalls in recovery are proportionate to their activity at the FMI is a way to provide such incentives. Moreover, allocating losses or liquidity shortfalls in a way that is likely to mean that they are borne solely by direct participants could discourage direct participation in the FMI, which in itself may carry potential risks.[22]

3.3.9 In addition, to the extent that losses and liquidity shortfalls are allocated to participants and other stakeholders, those stakeholders should be incentivised to monitor the FMI's risk-taking and risk management activities. Similarly, exposing owners to losses under recovery provides incentives for owners to ensure that the FMI is properly managing its risk. Conversely, tools such as capital calls on owners may act as a disincentive to investing in FMIs.

[21] Consistent with PFMI Principle 23, an FMI should provide sufficient disclosure to enable participants to have an accurate understanding of the risks they incur by participating in the FMI.

[22] Consistent with PFMI Principle 19, an FMI should identify and manage any risks it may face from the balance between direct and indirect participation.

3.3.10 Recovery tools should also incentivise participants, owners and other stakeholders to assist in the FMI's recovery process, particularly in the event of participant default. For example, tools that incentivise participants to participate in good faith and bid competitively in an auction of a defaulter's portfolio may increase the likelihood of the auction being successful.

3.3.11 To the extent that a tool creates additional risks to participating in an FMI, it may also result in additional capital charges to reflect that risk. For example, if a recovery tool disrupts participants' ability to manage and report exposure on a net basis, participants may reduce their activity at the FMI in order to reduce their risk and the resulting capital charges.

Minimum negative impact

3.3.12 The use of particular recovery tools by an FMI in certain stress scenarios may have particularly serious consequences for participants, markets and financial stability more broadly. Accordingly, the recovery tools should be developed in a way that minimises any negative impact to the broader financial system to the greatest extent possible. To avoid the use of recovery tools that are more disruptive to the financial system, an FMI may wish to explore procedures for its recovery plan that would allow for negotiation between the FMI and its owners and participants in order to agree to allocate losses and liquidity shortfalls and replenish financial resources by voluntary means.

3.4 Considerations for allocating losses and liquidity shortfalls

3.4.1 Losses and liquidity shortfalls could be allocated to direct participants, indirect participants, owners or third-party institutions, or some combination of these, to the extent permitted by ex ante arrangements such as the FMI's rules or specific provisions in contractual arrangements with indirect participants or third parties. The way in which losses or liquidity shortfalls are allocated may affect the ability of the financial system as a whole to absorb financial losses or liquidity shortfalls.

3.4.2 For example, there may be benefits to distributing losses or liquidity shortfall as widely as possible so as to minimise the amount 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 or liquidity shortfall. For some types of FMI, the concept of mutual exposure is a key risk control. Some loss or liquidity shortfall allocation methods might extend beyond owners and direct participants to indirect participants and third parties (eg other creditors or insurers), provided there is an ex ante binding agreement. However, such wide loss or liquidity shortfall sharing may not necessarily reflect the ability or willingness of each entity to create, manage and absorb the risks it brings to or incurs in the FMI.

3.4.3 Conversely, there may be benefits to allocating losses or liquidity shortfalls to those who have assumed roles that are consistent with absorbing such losses and liquidity shortfalls. Mutualisation of losses and liquidity shortfalls among direct participants in the case of participant default is based on this approach. Owners of the FMI who benefit from its profits are generally exposed to a share of the losses in a manner consistent with the extent of their investments and the FMI's legal basis. Business losses are generally allocated to the owners of the FMI. In many FMIs, losses due to participant default are also allocated to the owners of the FMI as an early part of the "default waterfall"; such so-called "skin in the game" allocations could be extended to recovery. Exposing owners to losses also provides appropriate incentives for them to ensure that the FMI is properly risk-managed. Thus, privately owned FMIs, when designing their recovery plans, should consider exposing their owners to losses arising from a participant default even when recovery tools rely to a large extent on participants.

3.4.4 For FMIs with mutualised allocation arrangements, direct participants are exposed to losses and liquidity shortfalls to the extent specified in ex ante rules and agreements. Such exposures can be limited based on participation in certain product classes or services, with participants being exposed to defaults only in product classes or services in which they participate (and the exposure may also be based on the extent of that participation). Loss and liquidity shortfall allocations may also be limited based on the extent of participation in links with another FMI.

3.4.5 Where direct participants are exposed to losses or liquidity shortfalls related to activities they conduct on behalf of indirect participants, those indirect participants may be indirectly exposed as specified in ex ante contracts with the relevant direct participant (for example, a participant that clears contracts on behalf of the indirect participant).

3.4.6 Losses can be imposed on owners by assigning losses to the FMI itself, or (in the case of recapitalisation) by diluting, subordinating or eliminating the interests of shareholders in the FMI, or through ex ante commitments by shareholders to provide additional capital under specific circumstances.

3.4.7 Participants may be more willing to share in losses if the FMI provides them with some form of compensating instrument proportionate to the size of the loss they incur. For example, the FMI could provide the participant with an instrument that has a degree of seniority in terms of being paid back from future profits of the FMI and money recovered from the defaulting participant in its insolvency. Where appropriate, the FMI might also give the loss-bearing participant the option to later convert the instrument into equity of the FMI. Moreover, it may be appropriate to reserve equity in the FMI to be used in exchange for those who provide new value as part of the replenishment process.

4 Specific recovery tools for FMIs

4.1 Introduction

4.1.1 This section describes specific tools that an FMI may include in its recovery plan, including considerations that should be taken into account when designing and adopting these tools. It explains how the individual tools are intended to work and what their impact on an FMI, its participants, linked FMIs and the financial system more widely is likely to be.

Summary of tools

4.1.2 There are different types of recovery tools with different purposes that might be applied by an FMI individually, in combination or in sequence. The advantages and disadvantages of the following tools are discussed in Sections 4.2 to 4.6 below. These recovery tools are not intended to constitute an exhaustive list. An FMI may have or seek to design additional tools to include in its recovery plan.

4.2 Tools to allocate uncovered losses caused by participant default

- Cash calls
- Variation margin haircutting by CCPs
- Use of initial margin
- Other tools (involving collateral and capital)

4.3 Tools to address uncovered liquidity shortfalls

- Obtain liquidity from third-party institutions
- Obtain liquidity from participants

4.4 Tools to replenish financial resources

- Cash calls
- Recapitalisation

4.5 Tools for CCPs to re-establish a matched book following participant default

- Forced allocation of contracts
- Contract termination: tear-up (complete, partial and voluntary)

4.6 Tools to allocate losses not caused by participant default

- Capital and recapitalisation
- Insurance or indemnity agreements
- Other tools

An FMI will also need tools to address any structural weaknesses that led to the need to implement its recovery plan but, as mentioned in paragraph 2.4.13, such tools are not addressed in this report.

Applicability of tools to different types of FMIs

4.1.3 Which tools are potentially applicable to a particular FMI depends on a number of factors, including the type of FMI, its specific design, the services it offers and its settlement arrangements, all of which will affect the risks to which it is exposed and the tools that are most appropriate and effective for dealing with them.

4.1.4 A key factor is whether the FMI is exposed to risks associated with a participant default, in particular credit and liquidity risks. CCPs are clearly exposed to credit and liquidity risk from a participant default, while trade repositories in general are not. For other FMIs, it will depend on their design. For example, a deferred net settlement system may be exposed to one or more financial risks relating to participant default.

4.1.5 Even for those FMIs that are exposed to credit and liquidity risk from participant default, not all the tools discussed in Sections 4.2 to 4.6 will necessarily be applicable or appropriate. For example, variation margin haircutting may not be an effective tool for CCPs where variation margin is not collected every day, or it may be considered by some authorities to be an inappropriate tool for CCPs in markets that primarily serve retail investors, because such retail investors may lack the ability to measure and manage the risk of the potential failure of a CCP.

4.1.6 The particular form of an FMI's settlement arrangements can also affect the usefulness of tools. For example, certain settlement arrangements might result in daily payouts being made to some or all participants before all expected daily pay-ins are received. In this case, an FMI's tools for allocating losses or liquidity shortfalls might be more limited or complicated than if no payouts had been made before the FMI had determined whether all pay-ins had been received.

4.1.7 Moreover, some FMIs may offer multiple services, with different recovery tools, or sets and sequencing of tools, being applicable for each service. For example, a CCP may clear more than one type of product. Or a central securities depository/securities settlement system may offer banking services (such as the provision of intraday credit) in addition to its core custodian and settlement service. An FMI's recovery plan needs to cover financial shortfalls arising from any of the FMI's activities, but the applicable tools may vary in each case.

4.2 Tools to allocate uncovered losses caused by participant default

4.2.1 Where the losses suffered by an FMI exceed pre-funded resources, and liabilities therefore exceed the assets the FMI has available to meet them, there are, in principle, two methods by which this can be addressed in a recovery plan: (i) the FMI can collect additional resources (eg cash calls) or (ii) the FMI can reduce its liabilities (eg haircut claims against it). The aggregate amount of loss that must be allocated is the same in either event and is no greater than if the FMI entered into insolvency.

4.2.2 In principle, recovery tools based on a reduction in liabilities could be used in advance of, in conjunction with, or following any other recovery tool for loss allocation. However, by effecting a reduction in the FMI's obligations to participants, the use of such tools may undermine participants' confidence in the FMI. Any failure of an FMI to meet its liabilities in full and on time is an extreme step which the PFMI and FMI risk management are intended to avoid even in extreme circumstances.[23]

4.2.3 It is therefore usual for a CCP, for example, to have rights to call on direct participants to provide additional resources, typically in the form of cash, to top up its default funds and avoid the outcome of a reduction in liabilities. However, for some CCPs clearing some products, these rights, often known as assessment rights or powers to make a cash call, are capped at an upper limit, beyond which the CCP would have to reduce its liabilities. Moreover, many CCPs, including those with uncapped assessment rights, also have powers to reduce liabilities because of the performance risk associated with cash calls (ie the risk that a participant may be unwilling or unable to meet a call).

4.2.4 The aggregate loss can be allocated in a number of different ways among the non-defaulting participants, and this will affect the measurability and controllability of the participants' exposure to potential losses. For example, cash calls can be proportional to pre-paid default resources, or to the marked to market value of the positions a direct participant brings to a CCP on a given day, or to some combination of these or other metrics. This will reduce the maximum loss that may fall on any individual non-defaulting participant by mutualising the loss amongst direct participants, generally in rough proportion to the risk they bring to the CCP.

[23] Thus, an FMI should use such tools for loss allocation only when the financial resources of the default waterfall of the FMI are exhausted. This is without prejudice to the reservation of some portion of assessment rights for replenishment purposes (see paragraph 4.4.3).

4.2.5 Allocating the loss through a reduction in liabilities, such as variation margin haircutting, or other gains-based haircutting, will link the maximum loss for any individual participant to the marked to market gains on the specific portfolio that it holds vis-a-vis the CCP, in a manner that is analogous to the treatment in insolvency of any bilateral credit exposure.

4.2.6 In both cases – cash calls (provided they are in some way related to the participant's position) or gains-based haircutting – the share of the aggregate loss will be based on a level of risk related to the non-defaulting participant's own activity at the CCP, over which the participant does have direct control. In the case of gains-based loss allocation, a participant that chooses to reduce its positions in the run-up to the default will have the opportunity to reduce its exposure, while in the case of cash calls based on default fund contributions, participants' exposures will often be based on activity over a longer period of time, giving such participants less flexibility to manage their risk.

4.2.7 The choice of tools is also likely to affect the distribution of losses between direct and indirect participants. In many jurisdictions, it is typical practice for direct participants to pass on losses on indirect participants' cleared positions and in such cases direct participants tend to prefer allocating losses through gains-based methods. Conversely, because direct participants typically do not pass cash calls on to indirect participants, indirect participants tend to prefer allocating losses through such calls. It is important that the FMI strike an appropriate balance in using these tools that does not unduly favour one form of participation over the other, while remaining consistent with legal requirements.[24]

Collecting additional resources: cash calls

4.2.8 For some FMIs, in particular CCPs clearing securities, a viable method of covering credit losses that exceed pre-funded resources is cash calls that are not capped. Cash calls can be measurable within some confidence level provided that there is sufficient disclosure by the FMI to model the exposure. They are controllable provided that the size of the cash call is linked to activity that the participant can control, for example their own aggregate level of activity at the CCP or past contributions to the default waterfall.

4.2.9 Uncapped cash calls are in principle comprehensive. Where, instead, cash calls are capped, their ability to fully meet a financial shortfall depends on whether, in the aggregate, the cap is below that of the shortfall. Because of this, cash call powers that are capped would need to be supplemented by other loss allocation tools.

4.2.10 The use of cash calls may affect incentives for risk-taking and risk management. The effect may depend on how the cash calls are allocated between participants. If, for example, the cash call 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 right would provide ex ante incentives for participants to limit the risks that they bring to the FMI.

4.2.11 One means of enforcing prompt collection of cash call obligations (ie making this tool more reliable and timely by reducing the performance risk) 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 where legally permitted and (i) where the use of such proprietary assets as collateral for such obligations is provided for in the rules ex ante; (ii) to the extent of any such committed obligation pursuant to the rules; and (iii) to the extent that paid-for assets of indirect participants are fully protected and not affected.

[24] Regardless of the recovery tool used by the FMI, the extent to which a direct participant would pass on losses to its indirect participants, whether through ex ante or ex post increases in fees, or otherwise, would depend on the contractual arrangements between the direct and indirect participants.

Haircutting of claims: variation margin haircutting and use of initial margin

4.2.12 An FMI's participants, and other creditors, may have a variety of different claims on an FMI, depending on the nature of the FMI's business: for example, an entitlement to receive variation margin; a claim related to the change in the value of a security that the FMI has undertaken to purchase or deliver (whether this relates to a previous day's transaction awaiting settlement or to an outstanding option to buy or sell a security); or a claim to repayment of an asset held on the FMI's balance sheet, such as a cash deposit or initial margin.

4.2.13 In theory, haircutting of claims could be applied either to all claims, either gross or net, or only to marked to market gains ("gains-based haircutting"). In some cases, claims and marked to market gains will be the same. For example, a claim to receive variation margin will often be identical to the marked to marked gain. But the claim may differ from the marked to market gain on a given day – for example, a claim related to an option to purchase or sell a security, or a claim to repayment of initial margin. In some cases, there may be variation margin flows on part of the position (for example futures), but not on other parts (for example offsetting options contracts).

4.2.14 One guide to the least disruptive form of haircutting may be the insolvency counterfactual – that is, basing haircuts on the net value of positions where netting would also determine the value of the claim in insolvency. However, FMI participants may prefer any haircut to be restricted to the marked to market position on cleared contracts, leaving claims to repayment of initial margin unaffected.

4.2.15 Tools involving haircutting of gains are powerful tools. They are potentially comprehensive, in that any loss or shortfall 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 payouts 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.

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

Variation margin haircutting

4.2.17 An important example of haircutting of gains is variation margin haircutting. When haircutting variation margin, the CCP may reduce 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.[25] "Variation margin haircutting" may also include pro rata reductions of other daily marked to market gains that are not passed through as variation margin. For example, in the case of options, there may be a pro rata reduction in the latest-day increase in the value of the long (purchased) option or the decrease in the obligation associated with short (sold) option.

4.2.18 The power to haircut variation margin may be capped at or below an amount equal to 100% of the total amount owed to each participant with an in-the-money (net) position. Unless capped at less than 100% of the amount owed, variation margin haircutting could be expected to cover comprehensively, reliably and promptly a loss caused by participant default on any given day.

4.2.19 Theoretically, variation margin haircutting can be done for a fixed period or on an ongoing basis pending participant votes or other decision points. However, over time participants may become

[25] The CCP's rules could specify that where amounts in default are ultimately recovered in the insolvency proceeding of the defaulting participant, such amounts would be distributed to participants who bore those losses.

unwilling to honour required variation margin payments on net out-of-the-money portfolios as they become due absent assurance of full collection of prospective gains on future net in-the-money portfolios from the CCP pending legal proceedings. Moreover, authorities 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.

4.2.20 In variation margin haircutting, 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. Further, because 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.

4.2.21 While variation margin haircutting thus appears to be a suitable and effective tool for allocating uncovered losses caused by participant default in respect of products for which variation margin payments are significant, there are some limitations that need to be observed. For example, as noted in paragraph 4.1.6, variation margin haircutting might be affected if a CCP's settlement process allows that some daily variation margin payouts might be made to some participants before the CCP has determined whether all daily variation margin pay-ins have been received. As another example, it may not be an effective tool for CCPs where variation margin is not collected every day.

4.2.22 In addition, 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 due to illiquidity in the contracts). If the haircutting power is limited to less than the total amount of variation margin owed it might also be insufficient to cover large losses and would need to be supplemented by other loss allocation tools.

4.2.23 Lastly, variation margin haircutting does not necessarily allocate losses to those who are best able to cope with them. 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. In addition, depending on the contracts between participants and their indirect participants, indirect participants may be exposed to losses if the variation margin on their positions is haircut by the CCP. Moreover, the burden of variation margin haircutting may fall more heavily on those with directional positions, who may tend to be end users, than on those with balanced positions. Indeed, variation margin haircutting may be considered by some authorities to be an inappropriate tool for CCPs in markets that primarily serve retail investors, because such retail investors may lack the ability to measure and manage the risk of the potential failure of a CCP.

Use of initial margin

4.2.24 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 the participant that posted it.[26] More generally, where initial margin is

[26] However, restrictions on or prohibition of the haircutting or mutualisation of initial margin as a recovery tool would not preclude, where legally permitted, rules-based use for liquidity purposes of the specific assets posted as initial margin (see paragraph 4.3.5) 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 4.2.11).

remote from the insolvency of the CCP, it would not be subject to haircutting in either recovery or insolvency.

4.2.25 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, in principle, be used as a tool in recovery. Haircutting initial margin involves the CCP writing down initial margin provided by non-defaulting participants, who would then be required to replenish the initial margin to the appropriate level, reduce their exposure at the CCP such that their remaining initial margin provides sufficient coverage, or a combination of both. If use of this tool is envisaged, the CCP's 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. Like variation margin haircutting, even where the CCP applies initial 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.

4.2.26 Initial margin is likely to constitute a very large pool of pre-funded assets which would, if it can be used, provide a high degree of loss absorbency. However, use of initial margin has significant disadvantages. Participants whose initial margin is used will be required to replenish it. If this is not done immediately, and the activity at the CCP remains constant, the CCP would be under-protected against future defaults and this could further undermine confidence in the CCP. Large margin calls following the haircutting of initial margin may also have significant procyclical effects. Moreover, participants, and 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. Lastly, participants might prefer initial margin to be bankruptcy-remote to avoid additional capital charges.

Other tools

4.2.27 While the use of initial margin typically applies to CCPs, some other FMIs with exposures to participant default may take collateral from participants where the purpose of that collateral is equivalent to that of the initial margin, ie to protect the FMI against the default of that participant specifically ("defaulter pays collateral") rather than as part of a pool of collateral to provide mutualised protection ("survivors pay collateral"). In such cases, the concerns about the use of initial margin in recovery in the previous sub-section would also be relevant to such FMIs.

4.2.28 Some FMIs may protect themselves against losses from participant default by use of part of their own capital and, if necessary, raising additional capital. This may occur as part of the normal default waterfall, in recovery or both. The use of capital is discussed further in Section 4.6 on losses not related to participant default.

4.3 Tools to address uncovered liquidity shortfalls

4.3.1 An FMI must meet the minimum liquidity requirements set out in Principle 7 of the PFMI using qualifying liquid resources in all relevant currencies such that it can effect same-day and, where appropriate, intraday and multi-day settlement of payment obligations in extreme but plausible market conditions. An FMI may also have supplementary liquidity to help bolster its liquidity resources in certain scenarios. Nonetheless, uncovered liquidity shortfalls may crystallise in extreme circumstances and liquidity tools are needed to address this risk. The most reliable forms of liquidity are likely to be cash and pre-arranged and highly reliable funding arrangements that qualify as liquid resources for meeting minimum requirements under Principle 7. In designing its recovery plan for extreme scenarios, however, an FMI will need additional tools to obtain liquidity from third-party institutions, its participants, or both.

Obtain liquidity from third-party institutions

4.3.2 An FMI may have arrangements in place with third-party institutions, including affiliated entities, to address uncovered liquidity shortfalls. Such tools may vary in their degree of reliability and be similar to forms of liquidity discussed in Principle 7. 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.[27] However, these less reliable forms of liquidity may not represent sufficient tools to address uncovered shortfalls in extreme but plausible market conditions. Hence, a recovery plan that contains such tools should also contain tools that will be effective in highly stressed environments.

Obtain liquidity from participants

4.3.3 Tools to obtain liquidity from 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 because it is based on the participant's position. Finally, participants are incentivised to monitor the FMI's liquidity risk management as well as their own individual liquidity risks in the system and to plan for their obligations should they materialise.

4.3.4 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 the FMI's 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.

4.3.5 Both options could theoretically take the form of either collateralised or uncollateralised lending from participants. Collateralised lending may make disruptions easier for liquidity providers to manage since they could use collateral as part of their funding plans. These loans could be collateralised by any assets available to the FMI that it is entitled to use. Where the FMI is a CCP and is legally permitted to use initial margin posted by non-defaulting participants as collateral to raise liquidity, it may significantly enhance the CCP's ability to raise funds on a collateralised basis. In extreme circumstances, however, uncollateralised lending may be the only remaining tool for an FMI to raise liquidity (eg when the FMI has exhausted assets available to the FMI that it is entitled to use as collateral or when collateral assets have severely deteriorated in value). Even in such circumstances, the FMI should have rules and procedures to address the repayment of any funds borrowed, which could provide some assurance to the lenders.

4.3.6 In both options, 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. The FMI may need to be particularly aware of the challenges for non-bank participants in providing liquidity or coping with a liquidity shortfall.

[27] See PFMI, Principle 7, Key Consideration 6.

4.4 Tools to replenish financial resources

4.4.1 As required by the PFMI, an FMI should have rules and procedures to replenish any financial resources it may employ in a stress event so that it can continue to operate in a safe and sound manner. Accordingly, an FMI should have the capacity to replenish promptly any depleted financial resources needed to meet minimum financial requirements under the PFMI. At the same time, market conditions or financial stability concerns at the time of a stress event might warrant a more measured pace for replenishment. In recognition of this potentially unavoidable trade-off, an FMI's rules and procedures should avoid automatic triggers but provide it with the capacity to effect a replenishment as soon as practicable, including by the following business day when that would be the case, along with the capacity and the responsibility to determine the most appropriate pace for replenishment in the light of prevailing circumstances. Authorities should be kept informed of any such determination by the FMI.

4.4.2 In its rules and procedures for replenishment, an FMI may specify that only its initial financial resources and its recovery plan will be used to deal with the initial stress event, with the replenished financial resources reserved for potential future stress events. In addition, the rules and procedures may allow participants to manage the number of times, beyond the first replenishment, that they are obliged to contribute additional resources by allowing them an opportunity to close out their positions and exit the FMI.

4.4.3 In order to replenish its resources, an FMI may either collect resources from its participants by means of cash calls (ex ante assessment rights, as discussed in Section 4.2) and/or raise additional equity capital (as discussed in Section 4.6). It may therefore be that an FMI relies on assessment rights both to meet uncovered losses and to replenish depleted resources. Where assessment rights are capped, an FMI could consider whether a portion of the assessment rights should be reserved for replenishment and, correspondingly, if it should make greater use of other tools to cover defaults.

4.5 Tools for CCPs to re-establish a matched book following participant default

4.5.1 After a participant defaults, a CCP will need to re-establish a matched book of obligations, stemming further losses. Returning to a fully matched book is essential for recovery.

Voluntary versus mandatory tools to achieve a matched book

4.5.2 Use of voluntary, market-based tools to re-establish a matched book is likely to lead to a better outcome than any mandatory, rules-based arrangement. To deal with a defaulter's outstanding obligations, a CCP would usually seek to (i) sell (eg through an auction or otherwise) to direct participants, indirect participants or third parties, any outstanding positions of a defaulter;[28] (ii) buy in any securities, currencies or other assets a defaulter has sold but failed to deliver; or (iii) sell any securities, currencies, or other assets a defaulter has bought but failed to pay. A CCP would need to meet the costs and to cover any losses arising from this process by drawing on available default resources and loss-sharing arrangements, in accordance with the CCP's default waterfall and recovery plan.

4.5.3 The consequences of being unable to re-establish a matched book through voluntary, market-based tools – and having to return to a matched book through use of mandatory tools such as forced allocation or tear-up of contracts – are likely to be less than optimal. To avoid the need to resort to such mandatory measures, the CCP should maximise the chances of a successful voluntary approach through appropriate use of the tools described in previous sections, such as assessment rights that would provide sufficient additional resources over and above its pre-funded default resources which it can

[28] In determining who can participate in such a sale, a CCP is expected to take into account the fact that successful bidders are acquiring an exposure to the CCP and will be required to meet ongoing risk management and other obligations under the CCP's rules,

draw on to fund a market-based sale, auction, or buy-in. A CCP should also consider establishing ex ante incentives for direct participants to support and to participate in any market-based sale, auction or buy-in, for example by establishing rules that would first allocate losses to participants that are not successful bidders in such voluntary approaches (eg by "juniorising" – or using first – the mutualised default fund contributions of such participants).

4.5.4 The use of such tools and incentives would tend to reduce, but would not eliminate, the likelihood that voluntary, market-based approaches will not succeed. For example, 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.

4.5.5 Accordingly, to address the likelihood that voluntary methods might prove insufficient to re-establish a matched book, a CCP will need to have a mandatory, ex ante agreed mechanism to do so, such as forced allocation or termination of contracts. Even though such tools carry potentially severe drawbacks and risks, a CCP should identify in its rules which mandatory tool(s) it would use to re-establish a fully matched book should voluntary mechanisms fail to do so.

Forced allocation of contracts

4.5.6 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 include in its rules contractual powers to allocate those positions to non-defaulting participants at a price determined by the CCP. If this tool is part of the FMI's recovery plan, the method of allocation should be set out ex ante. Examples of allocation methods include focusing on 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. It is important to note that the method selected for allocating contracts among a CCP's participants can be separate and distinct from the ex ante agreed method for sharing the associated losses among all of a CCP's participants – including those that might not be allocated any of the defaulter's contracts. For example, participants that are allocated the defaulter's contracts can be compensated, as far as resources allow, for acquiring these contracts. In this case, the contracts should be allocated with a value determined through an agreed methodology, for example a competitive auction which establishes a price. The defaulting participant's initial margin, the default fund and any assessment right or other agreed loss allocation method can fund such compensation payments. The effect of this is that the loss associated with the default and allocation of the defaulter's portfolio is partly covered through the default waterfall and loss allocation tools in the recovery plan, and therefore may be shared across all participants required to contribute to the waterfall and recovery tools whether they are allocated contracts or not. Any remaining loss is in effect shared by those allocated contracts.

4.5.7 Appropriate incentives could be built into a so-called "forced allocation" tool. For example, if participants are more likely to be allocated positions if they do not participate competitively in auctions or other aspects of the default management process, then the tool would incentivise participants to assist with default management.

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

4.5.9 Forced allocations could have different effects on participants depending on how the allocation methods are structured. Allocation methods that are more transparent ex ante and more closely related to participants' contracts or trading activities are relatively more measurable and controllable. Allocation methods that are less transparent ex ante and less closely related to participants' contracts or trading activities are relatively less measurable and controllable. However, forced allocation does mean that the net position of a participant vis-à-vis the CCP is subject to change.

4.5.10 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 methods may concentrate exposures on a subset of participants.

4.5.11 Some participants may consider that forcibly allocating what may be 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). Other participants may, evaluating the matter ex ante, consider that the possibility of forced allocations is worse than complete tear-up.

Contract termination: tear-up

4.5.12 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 the last available marked to market price) and, to the extent resources are insufficient to permit payment of marked to market gains, payments due to participants would be reduced pro rata (ie economically similar to variation margin haircutting). The termination could be (i) of all open contracts in a particular CCP ("complete tear-up"); (ii) of all open positions in a particular service (eg terminate CDS contracts but not IRS contracts); (iii) of only those contracts needed to offset the defaulted contracts; or (iv) contract tear-ups designed to minimise the impact on netting sets. However, if "contract termination" does not cover all contracts in a netting set, it will almost certainly alter net positions with potential implications for the enforceability of closeout netting and thus for participants' capital charges.[29]

4.5.13 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 and the CCP's rules, and subject to compatibility with statutory or regulatory requirements. The effect of either complete or partial tear-up on indirect participants would depend on direct participants' arrangements with their indirect participants.

Complete tear-up

4.5.14 Complete tear-up terminates all positions, matched or unmatched, such that trades cleared by the CCP do not proceed to settlement, and any remaining CCP resources are used to compensate those with claims on the CCP in a manner set out in the rules. Because all participants would be affected by complete tear-up, it may also strengthen incentives to participate in an auction.

4.5.15 Complete tear-up may expose participants to replacement cost risk at the point of termination, but would preserve the integrity of the participants' net positions, allowing participants to control and assess their exposure.

4.5.16 However, complete tear-up is equivalent in its effect to closure or wind-down of the CCP, albeit in a manner which would allow a restart should participants wish. Its use 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 be costly and exacerbate already volatile market conditions. Moreover, as a complete tear-up implies a termination of the contracts before their original termination or settlement date, this tool does not fully achieve the objective of continuity of the key services provided by the CCP, in particular continuity of contracts. Participants may consider termination and wind-down to be the least bad option in some cases, but they might also consider it unacceptable for the trades not to proceed to the original termination or settlement date, particularly if their risk management relied upon derivatives positions and they could not plausibly recreate these positions at an alternative CCP or in the non-cleared market.

[29] A technique which permits a CCP to change the set of transactions between itself and a participant before default does not necessarily hinder closeout netting, as it may simply represent an option which participants grant the CCP. However, even if closeout netting is still enforceable, the question of what capital charges would be applied would still remain.

Use of complete tear-up should be avoided to the extent practicable, and the use or imminent use of such a tool may be a trigger for resolution.

Partial tear-up

4.5.17 Partial tear-up is another tool to re-establish a matched book. Partial tear-up could have different effects on participants depending on how it is structured. Partial tear-ups that are more transparent ex ante and more closely related to participants' trading activities are relatively more measurable and controllable. In general, tear-up procedures that are less transparent ex ante or less closely related to participants' trading activities are relatively less measurable and controllable. Such transparency requires a means established ex ante by which partial tear-ups will be allocated among participants (whether direct or indirect).

4.5.18 One of the drawbacks of partial tear-up is the lack of control that participants, both direct and indirect, have over whether their contracts will be torn up. Another drawback of partial tear-up is that it cannot be comprehensive unless all participants, direct and indirect, are subject to its application. As with forced allocation, however, those who are subject to partial tear-up can be compensated, to the extent possible, from the resources available through the default waterfall and recovery tools.

4.5.19 Participants whose positions are torn up will be vulnerable to replacement cost risk from the point of termination. However, the most significant potential drawback of partial tear-up is that the participants' netting sets will be broken and it may be difficult to re-establish them, particularly in a volatile market environment.[30] This may be particularly concerning for participants who seek to maintain positions. Therefore, the partial tear-up tool may create exposure for participants that they are not well able to measure and manage. For this reason, participants may have ex ante objections to contractual powers of partial tear-up, notwithstanding that it could turn out to be the least disruptive option to the market as a whole in the difficult circumstances of a failed auction.

4.5.20 Partial tear-up may affect incentives for participation in an auction. For example, unlike complete tear-up, where all participants would be affected, it is conceivable that partial tear-up may only affect a subset of participants with unmatched positions, so that others would not have incentives to bid in an auction.

Voluntary tear-up

4.5.21 Voluntary tear-up is a rules-based mechanism for an FMI to invite participants to nominate contracts for tear-up to assist restoration of a matched book with or without an auction. If voluntary tear-up is successful in fully restoring a matched book, it avoids the disruption of a partial or complete mandatory tear-up without compromising participants' control of their net positions vis-à-vis the CCP.

4.6 Tools to allocate losses not caused by participant default

4.6.1 An FMI will need to be able to recover from an extraordinary one-off loss or recurring losses from general business, custody and investment risks. To that end, an FMI needs to have both sufficient capital and a viable plan to recapitalise in circumstances where the FMI's capital is used to absorb such losses. An FMI should also consider having explicit insurance or indemnity agreements to cover such losses.

4.6.2 In particular, an FMI should have comprehensive arrangements in place to allocate losses from the custody and investment risks it incurs as a result of its clearing and settlement activity – for example,

[30] The fact that the positions that are being allocated as part of partial tear-up are the result of an inability of the CCP to liquidate them suggests that these positions may be difficult for the participants to liquidate as well.

risks arising from investment of participants' cash margins, from participants' funds held at payment or settlement banks, or from participants' assets held in custody.

Capital and recapitalisation

4.6.3 An FMI must have sufficient capital to enable it to absorb general business losses. Allocation of such losses should begin with the premise that the losses are first charged against the FMI's capital, ie they should be borne in the first instance by the owners of the FMI. The unique loss allocation arrangements present in FMIs such as CCPs, such that some losses (in particular credit losses) are largely borne by the users of the FMI, should not detract from the fact that ownership of an FMI comes with responsibilities – just as for the ownership of any other type of entity. Losses relating to general business risks are properly the responsibility of the owners of the FMI. For custody and investment risks, FMIs should consider exposing their owners to a share of losses arising from the risks, even if the FMI and its participants decide that it is also appropriate for participants to share some of the losses or necessary for them to do so to ensure the losses can be fully addressed.

4.6.4 Although an FMI should have sufficient capital to absorb the losses, in those FMIs that are organised as limited liability entities shareholders cannot lose more than the total of their investment. Hence the amount of resources which can be obtained from them may be less than the loss faced by the FMI. Even where capital is sufficient, the FMI will need to replenish it after it has been used. An FMI should therefore have a viable plan to increase its capital, and meet its capital requirements, for example, by recapitalisation 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. 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 shareholders and, where they are involved in the loss-sharing, participants in an FMI. Following the occurrence of losses, an FMI must ensure that its financial viability is restored within a reasonable time.

4.6.5 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 that 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. Other elements that may need to be considered are the available loss absorption capacity and the additional resources potentially needed to address the selected recovery scenarios.

4.6.6 Another appropriate means for capital-raising could be for an FMI to develop, ex ante, contingency plans to structure optional contributions for recapitalisation, for example from participants in the FMI. In such circumstances, such optional contributors could 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.

4.6.7 Where an FMI has debt in its capital structure, a further appropriate means for raising capital could be for an FMI to develop ex ante arrangements with the existing debt holders regarding the bail-in of their instruments.

4.6.8 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.

Insurance or indemnity agreements

4.6.9 Insurance (eg from a third party) or indemnity agreements (eg from a parent, owners or participants) may be an effective way of addressing the impact of specific business 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 measures to address the root cause of its financial distress in addition to replenishment of financial resources.

4.6.10 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.

4.6.11 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 possible for an indemnity provider to establish the maximum amount of additional support that the provider is willing to provide to the FMI.

Other tools

4.6.12 As noted above, in some FMIs, for some forms of losses not related to participant default, an FMI and its participants may decide that it is appropriate for participants to share at least some of the loss, in which case the recovery plan might include one or more of the tools set out in Section 4.2, such as cash calls on participants.