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Payments and Market
Infrastructures

Board of the International
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Commissions

Report on current central counterparty practices to address non-default losses

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Executive summary

The purpose of this report is to present current practices among central counterparties (CCPs) in addressing potential losses arising from non-default events (ie non-default losses or NDLs) in order to facilitate the sharing and common understanding of existing practices and to advance industry efforts and foster dialogue on CCPs' management of potential losses arising from NDLs, in particular in the context of recovery or orderly wind-down.[1] It is not intended to create additional standards for financial market infrastructures (FMIs) or to provide guidance on existing standards. It also does not represent an assessment of current CCP practices.

The Bank for International Settlements' Committee on Payments and Market Infrastructures (CPMI) and International Organization of Securities Commissions (IOSCO) *Principles for financial market infrastructures* (PFMI)[2] addresses NDLs in a number of places. Principle 3 calls for CCPs to "have a sound risk-management framework for comprehensively managing" the range of risks to which they are subject. Principle 15 addresses general business risk. Explanatory note (EN) 3.15.1 of the PFMI explains that "general business risk refers to the risks and potential losses arising from an FMI's administration and operation as a business enterprise that are neither related to participant default nor separately covered by financial resources under the credit or liquidity risk principles". PFMI EN 3.15.1 and the CPMI-IOSCO's *Recovery of financial market infrastructures – Revised report* ("CPMI-IOSCO Recovery Guidance")[3] note that business-related losses may also arise from legal, custody, investment or operational risks. For the purpose of this report, NDL risks are used to refer to the various risk events that could lead to NDLs.

While NDLs are addressed in the PFMI and the above-mentioned guidance, there is limited common understanding of CCPs' current practices to address NDLs. This report is informed by the current practices at various CCPs and, in particular, the key concepts and processes used by CCPs in:

1. developing methodologies and practices for: (i) identifying scenarios in which NDLs may occur (NDL scenarios); (ii) quantifying potential NDLs; and (iii) assessing the adequacy of resources and tools available to address NDLs (Section 2);
2. achieving the operational effectiveness of plans to address NDLs (Section 3);
3. reviewing, exercising and testing plans for addressing NDLs (Section 4); and
4. providing effective governance of and transparency regarding plans for addressing NDLs both in advance of and during a non-default event, as well as engaging with participants[4] and authorities (Section 5).

Section 1 surveys the background and inputs to this report and clarifies its objectives.

Section 2 discusses the underlying analysis conducted by CCPs to develop their plans to address NDLs. The starting point of the analysis is to identify NDL scenarios in a manner consistent with PFMI Principle 3, Key Considerations 1 and 4, including those that might lead to recovery. This is also in line with the CPMI-IOSCO Recovery Guidance, which notes that an FMI should identify scenarios that may prevent it from being able to provide its critical services as a going concern.[5] Further analysis includes quantifying potential loss exposures under the identified scenarios, identifying the tools and quantifying the resources available to address those

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1 The paper also recognises that liquidity shortfalls may arise from such events and addresses CCPs' practices to identify and address potential liquidity gaps from non-default events.

2 See Committee on Payment and Settlement Systems (CPSS) and International Organization of Securities Commissions (IOSCO), *Principles for financial market infrastructures*, April 2012.

3 See CPMI-IOSCO *Recovery of financial market infrastructures – Revised report*, July 2017.

4 Participants include direct participants (eg clearing members) and indirect participants (eg customers of clearing members).

5 See CPMI-IOSCO Recovery Guidance, paragraph 2.4.5. This analysis is also informed by related work by the Financial Stability Board. See Section 1.2 of Financial Stability Board, *Guidance on Financial Resources to Support CCP Resolution and on the Treatment of CCP Equity in Resolution*, November 2020. (*FSB Guidance on Financial Resources in Resolution*).

losses, comparing the available tools and resources with the potential loss exposures, considering the timing of any liquidity needs to help identify any potential resource shortfalls and developing plans to address any shortfalls. Finally, the section discusses a range of practices in planning for an orderly wind-down as a result of NDLs if the recovery plan proves, in particular circumstances, to be ineffective.

Section 3 addresses practices to promote the operational effectiveness of a CCP's plans to address NDLs, ie taking steps to assess the likelihood that the intended results of the CCP's approach will be achieved and to strengthen practices when appropriate. This includes measures targeting the enforceability of the CCP's intended tools as well as the reliable performance of relevant stakeholders and third parties. These aspects are especially important given the historical lack of experience with severe NDLs events requiring the use of recovery tools. The section also discusses how CCPs promote the appropriate use of resources and tools within any applicable regulatory or contractual constraints. Finally, the section surveys the information technology systems and processes that are available to support CCPs' efforts to address NDLs should they arise.

Section 4 considers the review and testing of plans to address NDLs. This includes internal reviews of plans to address NDLs, the use of crisis management exercises to test plans (both at a CCP-specific level and through participation in industry-led multiple-CCP exercises) and the inclusion of internal governance structures and participants (and other relevant third parties) in such exercises. It also describes CCPs' measures to use the results of such reviews and exercises to improve plans to address NDLs and to inform the design and conduct of future exercises.

Section 5 discusses CCPs' approaches concerning governance, transparency and engagement with participants and authorities. In this context, governance focuses on reviews by senior management, and ultimately the board, of the methodology, practices and assumptions for managing potential NDLs. It also addresses who should be responsible for taking decisions regarding the use of tools for addressing specific NDL scenarios. Transparency measures include various practices to promote adequate disclosure to relevant stakeholders of the CCP's methodologies for identifying potential NDL scenarios and quantifying potential NDLs, including any relevant assumptions, as well as the CCP's plans to address NDLs, including the resources and tools available to do so. Disclosure to relevant stakeholders concerning tools that have a direct impact on market participants is considered particularly important to ensure that market participants are prepared to manage these impacts.

Some of the current practices described in this report may be drawn from the PFMI or the CPMI-IOSCO Recovery Guidance; others may not be explicitly set out in the PFMI or existing guidance. The cover note to this report sets out the next steps for further work, which will build on the current practices and key concepts and processes identified in this paper.

1. Introduction

1.1 Background and inputs to the report

In 2012, the predecessors to the Bank for International Settlements' Committee on Payments and Market Infrastructures (CPMI) and International Organization of Securities Commissions (IOSCO)[6] published the *Principles for financial market infrastructures* (PFMI), which significantly strengthened the international standards for risk management by FMIs, including CCPs. CPMI and IOSCO have advanced these standards by publishing additional reports and guidance, including the CPMI-IOSCO Recovery Guidance.

6 These predecessors were, respectively, the Committee on Payments and Settlement Systems (CPSS) and the Technical Committee of the International Organization of Securities Commissions (IOSCO).

This work, as well as other work by authorities, CCPs and clearing participants, has significantly advanced our understanding and progress on addressing losses arising from clearing member defaults and estimating their magnitude. For example, CCPs' methodologies for quantifying potential default losses are covered in detail by the foregoing standards and guidance and are reasonably well understood by all stakeholders. These include the use of margin models and stress testing, as well as resources (eg initial and variation margin, CCPs' own funds ("skin in the game") and prefunded default funds) and tools (eg assessment powers and variation margin haircutting). The industry has also worked on enhancing and standardising some aspects of CCP default auctions, in line with the CPMI-IOSCO report *Central counterparty default management auctions – issues for consideration*.[7] By contrast, while NDLs are addressed in the PFMI and the above-mentioned guidance (as discussed below), there is much more limited common understanding of CCPs' current practices to estimate the magnitude of potential NDLs and to provide confidence that they have adequate resources and appropriate tools to address them.

The severity of NDLs can be considered across a continuum, ranging from small losses that arise from minor day-to-day incidents, through larger losses from more serious but less frequent risk events, to significant losses from catastrophic events that could threaten the CCP's ability to continue providing critical services and even its viability as a going concern. All well-run businesses, including CCPs, should have a sound risk management framework to mitigate the likelihood that these risks will materialise, but should also plan to address the resulting NDLs if they do.

Because of CCPs' importance to the financial system, the PFMI calls upon them and other FMIs to (i) consider scenarios covering the entire spectrum of risks that may potentially prevent them from maintaining their critical operations and services as a going concern, even where the realisation of those risks may be highly unlikely; (ii) assess the effectiveness of a full range of options for recovery or orderly wind-down given those scenarios; and (iii) prepare appropriate plans based on that assessment.[8] The CPMI-IOSCO Recovery Guidance further notes that "these scenarios should take into account the various risks to which the FMI is exposed".[9]

The PFMI addresses the various risks that could lead to NDLs in Principle 15 on general business risk. EN 3.15.1 states that "general business risk refers to the risks and potential losses arising from an FMI's administration and operation as a business enterprise that are neither related to participant default nor separately covered by financial resources under the credit or liquidity risk principles". The EN and the CPMI-IOSCO Recovery Guidance note that business-related losses may also arise from legal, custody, investment or operational risks.[10]

A number of additional provisions in the PFMI address recovery and orderly wind-down applicable to recovery from NDL events. Principle 15 of the PFMI states that "liquid net assets should at all times be sufficient to ensure a recovery or orderly wind-down of critical operations and services". Further, Key Consideration 2 of PFMI Principle 15 states that "the amount of liquid net assets funded by equity an FMI should hold should be determined by its general business risk profile and the length of time required to achieve a recovery or orderly wind-down, as appropriate, of its critical operations and services if such action is taken". Key Consideration 5

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7 See CPMI-IOSCO, *Central counterparty default management auctions – Issues for consideration*, June 2020.

8 See PFMI Principle 3, Key Consideration 4: A CCP "should identify scenarios that may potentially prevent it from being able to provide its critical operations and services as a going concern and assess the effectiveness of a full range of options for recovery or orderly wind-down" and "should prepare appropriate plans for its recovery or orderly wind-down based on the results of that assessment".

9 See CPMI-IOSCO Recovery Guidance paragraph 2.4.5.

10 The PFMI explicitly addresses the mitigation of each category of risks that can lead to NDL events. For example, Principle 15 (General business risk) provides that an FMI "should identify, monitor and manage its general business risk", while Principle 17 (Operational risk) provides that an FMI "should identify the plausible sources of operational risk, both internal and external, and mitigate their impact through the use of appropriate systems, policies, procedures and controls". Principle 16 (Custody and investment risks) provides: "an FMI should safeguard its own and its participants' assets and minimise the risk of loss on and delay in access to these assets. An FMI's investments should be in instruments with minimal credit, market and liquidity risks." Principle 1 (Legal basis) provides that an FMI "should have a well-founded, clear, transparent and enforceable legal basis for each material aspect of its activities in all relevant jurisdictions".

of PFMI Principle 15 also states that "an FMI should maintain a viable plan for raising additional equity should its equity fall close to or below the amount needed".

The CPMI-IOSCO Recovery Guidance calls on FMIs to develop a set of recovery tools that, to the extent practicable, is (i) comprehensive with respect to all relevant scenarios (including, for these purposes, NDL scenarios); (ii) effective; (iii) transparent, measurable, manageable and controllable; and that (iv) creates appropriate incentives while (v) keeping negative impacts to a minimum.[11]

With respect to NDLs in particular, the CPMI-IOSCO Recovery Guidance provides that an FMI needs to have both sufficient liquid net assets funded by equity to implement its recovery plan or conduct an orderly wind-down of its critical operations and a viable plan to raise new equity capital in circumstances where the FMI's equity capital is used to address NDLs.[12]

To address the more limited common understanding of industry practices for implementing these standards and guidance in the context of addressing NDLs, CPMI and IOSCO gathered information on current industry practices. CPMI and IOSCO distributed a questionnaire and received 17 answers representing responses from 20 CCPs in 10 jurisdictions, and also conducted an information session with representatives of the responding CCPs.

One theme common to the questionnaire responses and the discussion at the information session is that there is a dearth of relevant internal or external historical data related to actual experience of NDLs threatening the viability of a CCP. However, as CCPs generally recognise, past performance is no guarantee of future results, and there is hence a need to avoid conflating "unknown risk" or "low risk" with "no risk".

With the aid of these inputs, on 4 August 2022, CPMI-IOSCO published for consultation *A discussion paper on central counterparty practices to address non-default losses*. During the consultation period, CPMI and IOSCO also held an industry workshop with representatives of CCPs (including but not limited to those that responded to the questionnaire) and clearing members.

Responses to the discussion paper were received from CCPs and their associations, from clearing members and clients and their industry associations, from authorities not represented in CPMI-IOSCO and from a potential service provider.

Those responses were generally highly supportive of the need to conduct this work and increasing the sharing of information on this important aspect of CCPs' risk management. CCPs' comments provided helpful detailed information on their current practices. Clearing members and clients suggested areas where they thought existing practice should be improved or areas where CPMI-IOSCO's work should be extended. In particular, concerns were expressed about the adequacy of financial resources concerning NDLs and the need for further transparency on current practices.

Together with the CPMI-IOSCO's working knowledge of current CCP practices, these inputs form the basis for this report.

1.2 Objectives of the report

This report is intended to present current practices among CCPs in addressing NDLs. It is not intended to create additional standards for FMIs or to provide guidance on existing standards. It also does not represent an assessment of current CCP practices.

It is a descriptive paper intended to help advance industry efforts and foster dialogue by facilitating the sharing and understanding of current practices employed by CCPs to address NDLs and by highlighting

[11] See Recovery Guidance paragraph 3.3.1.

[12] See Recovery Guidance paragraph 4.6.1.

opportunities and challenges for CCPs to improve their planning for management of NDLs. It considers both the development of plans during business as usual for addressing NDLs and the implementation of those plans to address NDLs during an actual event, particularly in the context of recovery and orderly wind-down.

This report may also inform CCP supervisors, central banks and other relevant authorities on the current state of CCPs' practices for addressing NDLs, including potentially on areas where further improvements might be helpful.

2. Identifying scenarios that could lead to NDLs, quantifying potential NDLs and assessing the sufficiency of resources and tools

Principle 3 of the PFMI states that "an FMI should have a sound risk-management framework for comprehensively managing legal, credit, liquidity, operational and other risks", while Key Consideration 1 of PFMI Principle 3 states that "an FMI should have risk-management policies, procedures and systems that enable it to identify, measure, monitor and manage the range of risks that arise in or are borne by the FMI". EN 3.3.3 of the PFMI further clarifies that comprehensive FMI risk policies, procedures and controls should "cover routine and non-routine events" and "address all relevant risks, including legal, credit, liquidity, general business and operational risks".

In addition, Key Consideration 4 of PFMI Principle 3 states that a CCP "should identify scenarios that may potentially prevent it from being able to provide its critical operations and services as a going concern and assess the effectiveness of a full range of options for recovery or orderly wind-down" and "should prepare appropriate plans for its recovery or orderly wind-down based on the results of that assessment". The CPMI-IOSCO Recovery Guidance further states that, in the recovery plan, "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".[13] The CPMI-IOSCO Recovery Guidance notes that an FMI should evaluate the strengths and weaknesses of recovery tools so that it can choose the set most appropriate for each relevant recovery scenario, including the sequence in which the tools should be used.[14]

A CCP's efforts to quantify the potential NDLs from various scenarios it identifies based on its unique risk profile can support the CCP's development of a recovery plan, making it more likely that the plan will be effective.[15] Endeavouring to quantify potential NDLs is a means to help CCPs understand potential NDLs, assess the effectiveness of their plans to address losses from non-default events as well as the effectiveness and comprehensiveness of their recovery tools, and identify further tools as necessary.[16]

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13 See CPMI-IOSCO Recovery Guidance paragraph 2.4.9.

14 See CPMI-IOSCO Recovery Guidance paragraphs 3.3.1 to 3.3.2.

15 As noted above, Key Consideration 1 of PFMI Principle 3 calls upon CCPs to "measure […] the range of risks that arise in or are borne by the FMI".

16 This quantification of potential NDLs is a separate exercise from calculating the sufficient amount of liquid net assets funded by equity to implement a recovery or orderly wind-down plan under Principle 15 of the PFMI. Principle 15 states that "liquid net assets should at all times be sufficient to ensure a recovery or orderly wind-down of critical operations and services". Principle 15 of the PFMI also states that "an FMI should identify, monitor and manage its general business risk and hold sufficient liquid net assets funded by equity to cover potential general business losses". Key Consideration 2 of PFMI Principle 15 states: "An FMI should hold liquid net assets funded by equity (such as common stock, disclosed reserves or other retained earnings) so that it can continue operations and services as a going concern if it incurs general business losses. The amount of liquid net assets funded by equity an FMI should hold should be determined by its general business risk profile and the length of time required to achieve a recovery or orderly wind-down, as appropriate, of its critical operations and services if such action is taken."

2.1 Identification of NDL scenarios and quantification of NDLs

While CCPs have generally implemented risk management practices to address NDLs, the level of sophistication of these approaches varies significantly. CCPs generally consider a range of NDL scenarios that may arise from risks relevant to their business activities, including general business risk, operational risk, investment risk, custody risk and legal risk. Scenarios used by CCPs also generally include periods of macroeconomic stress, including financial crises and the Covid-19 pandemic.

Some CCPs have frameworks that adopt the practice of considering the risks arising from their activities both comprehensively and separately from each other, in line with the nature of the CCP's business, its products and the markets cleared. These analytical frameworks, alongside the widespread use of subject matter experts, help to ensure that resources and tools to address NDLs are tailored to the specific nature of the risks faced by a CCP and to achieve an appropriate degree of granularity.

Some CCPs also consider the possibility that a default loss event could occur at the same time as an NDL event (eg the simultaneous defaults of a clearing member and an investment counterparty or custodian holding collateral posted by that clearing member). In this context, some CCPs also consider the possibility that a highly interconnected entity (eg an entity that is a clearing member, custodian, settlement bank and liquidity provider) might fail and consider the implications for the CCP's default management, liquid resources and capital adequacy.[17] Some CCPs codify these scenarios within their recovery plans and consider the varying impacts of a combination of default and non-default loss scenarios, on a spectrum from minor to worst case, in order to ensure they are prepared for all eventualities. Given the nature of these risks, CCPs also tend to consider the plausibility of such events when developing the scenarios.

CCPs mitigate risks unrelated to a participant default as part of their business-as-usual risk management activities in line with the PFMI.[18] However, the PFMI also states that a CCP should have a recovery plan to address losses should these risks materialise, so that the CCP can continue operations and services as a going concern.

The risk of a specific type of NDL materialising might be low due to the CCP's internal controls and other risk mitigants. However, low risk is not zero risk. Yet some CCPs do not include certain types of NDL scenario in their planning because they seem to assume that regulated financial institutions or central securities depositories pose zero depository or custody risk, or that legal risk cannot cause an NDL (because Principle 1 of the PFMI requires a legal basis with "a high degree of certainty"). These approaches appear to be inconsistent with the standards set forth in the PFMI.

2.1.1 Quantification of potential NDLs

Some CCPs conduct analysis to quantify potential NDLs and support the development of appropriate resources and tools for addressing NDLs, including NDLs that may lead to recovery. Examples of approaches adopted by some CCPs include quantifying potential NDL exposures separately for each relevant type of risk and confirming adequate resource coverage.

Some CCPs note the challenges for quantification, which include the limited historical precedent or data surrounding NDL events and the scale of any losses that would need to be absorbed. Some CCPs use external loss data from other industries or from data providers, eg the operational loss data provided by ORX and IBM FIRST Risk Case Studies. However, they note the limitations of these external data given the idiosyncrasies of the CCP industry.

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[17] Approaches used by CCPs to understand the challenges in simultaneous participant default and non-default events similarly include scenario analysis, tabletop exercises (internal and multi-CCP) and stress testing. See Section 4 for discussion of these approaches.

[18] In particular, a CCP's ongoing compliance with Principle 1 (Legal basis), Principle 3 (Framework for the comprehensive management of risks), Principle 5 (Collateral), Principle 15 (General business risk), Principle 16 (Custody and investment risks) and Principle 17 (Operational risk) of the PFMI is essential for mitigating these risks. For example, CCPs have investment policies to mitigate investment risk, and they implement measures to mitigate and monitor custody risk.

To address those limitations, some CCPs rely on the use of internal expertise to develop additional sensitivity analysis, scenario simulations, drills or stress testing analysis to help estimate the potential scale of losses. These include approaches based on extreme adverse business and operational scenarios (eg fall in capital and profits, financial losses resulting from system outages or cyber attacks) extrapolated from past incidents, historical market volatility or historical price movements. In their analysis, some CCPs also consider in their quantification approaches varying degrees of market stress, which could include wider macroeconomic scenarios such as a global financial crisis.

2.1.2 Sources of information

Scenarios and assumptions concerning potential losses are commonly informed by expert judgment from both internal and external subject matter experts given the inherent challenges of modelling potential losses in what are low-probability, high-impact events with limited historical data.

Some CCPs also consider lessons learned from other types of financial institution (banks in particular) when assessing NDL exposures. This includes using and adapting risk assessment best practices, publicly available data related to operational risk events and external loss events, and industry best practices for banks.

For example, some CCPs use the methodology from the former Basel II framework, which offers multiple options for risk quantification: the Advanced Measurement Approach (using an internal risk model), the Standardised Approach (using calculations based on business-line gross income) and the Basic Indicator Approach (using calculations based on total annual gross income).[19] Some CCPs have concluded that the tools in these frameworks can be adapted to their specific circumstances using internal expertise and knowledge of their unique business practices. Some CCPs refer to the operational loss categorisation under Basel II for information on the list of potential loss event types, definitions and examples. Other CCPs have used a variety of accounting standards to help capture potential losses in specific risk areas. Some CCPs also participate in industry groups where they can compare their internal risk frameworks with practices adopted by similar financial institutions.

Considering insights from other parts of the financial industry is, in principle, a helpful practice. However, there may be limitations and challenges in terms of accurately assessing the risk of NDLs on this basis and adapting industry-specific data sources to CCP markets and risk frameworks. Nonetheless, there is room for industry collaboration to adapt external frameworks to meet the needs of CCPs, perhaps including anonymous sharing of events resulting in NDLs. Some CCPs indicated that they do confer with others to discuss the data and approaches they may use to calculate potential NDLs, and others reported openness to a wider industry discussion in this space or even to creating a repository of scenarios that CCPs can draw on for future reference.

2.1.3 Considering risk-specific factors

In survey responses, many CCPs noted that certain non-default events that could lead to financial losses, such as custody[20] or physical disaster risks, require risk-specific analysis, such as considering factors that are highly specific to the geographic location of the CCP's operations. Consequently, effective means of identifying scenarios and quantifying potential losses would reflect those unique characteristics.

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[19] In December 2017, the Basel Committee on Banking Supervision published a new set of regulatory capital standards for internationally active banks, which includes a new standardised approach for operational risk capital (ie the Standardised Measurement Approach). See Basel Committee on Banking Supervision, *Basel III: Finalising post-crisis reforms*, December 2017.

[20] For example, CCPs reported that there are generally limited avenues for addressing custody risk irrespective of where assets are held. In a market with fewer options for holding assets in custody, transparency and engagement with participants and relevant third parties are important means of addressing custody risk. The choice of custodian also may be relevant because the evaluation of risk will differ between a custodian bank and a central securities depository. However, in the event that more than one custody provider is available in a market, holding assets with more than one custodian could be a method for risk mitigation.

2.2 Available resources and tools to address NDLs

CCPs have a variety of resources and tools at their disposal to cover potential NDLs. The available tools can draw on internal or external sources of funds and can vary depending on the CCP's ownership structure (eg industry utility vs for-profit ownership). Some tools draw on financial resources held in the form of highly liquid assets; other assets might take time to realise, which can create liquidity gaps depending on when the NDLs crystallise.

CCPs' plans regarding which tools to use in any given scenario are generally based on a number of factors. For example, they consider the type of non-default risk causing the potential or actual loss (or liquidity need), the amount of financial resources required to address the potential or actual loss (or liquidity need), and the speed with which the respective financial resources can be monetised. A few CCPs have sought to define specific scenarios under which certain types of tool would be expected to be used, which can be helpful to guide and speed up activation.

This subsection discusses own funds maintained by the CCP (liquid net assets funded by equity), rule-based allocation of losses, external financing (debt or equity), insurance and replenishment (eg funding from affiliates).

2.2.1 CCPs' own funds

As noted above, PFMI Principle 15, Key Consideration 3 calls for CCPs to hold liquid net assets funded by equity sufficient to implement their recovery or orderly wind-down plans; at a minimum, a CCP should hold liquid net assets funded by equity equal to at least six months of operating expenses. However, in calculating the necessary amount of resources, some CCPs rely solely on the minimum amounts stated in the regulatory capital requirements applicable in the relevant jurisdiction or the six months of current operating expenses stated as the minimum under the PFMI. Relying solely on the minimum regulatory capital amount without an analysis of the costs of implementing a recovery and orderly wind-down plan may be inconsistent with Principle 15 of the PFMI.[21] Some CCPs conduct additional analysis to ensure that the wind-down can in fact take place within the six-month window, and where they determine that this will take longer, they are obliged to hold the additional level of resources required. These are, in some jurisdictions, subject to supervisor review, and recovery plans may oblige CCPs to demonstrate the liquidity of the resources held to ensure that they can feasibly restore their viability.

CCPs generally consider own funds, in particular liquid net assets funded by equity, to be the primary resource for covering NDLs. Some CCPs plan to use these assets to cover various types of NDL, and some would plan to use such resources to bridge liquidity gaps when the NDL would ultimately be covered by another source of funds that is not immediately available.[22] Some CCPs specifically designate how their own funds would be used in each scenario they have identified (eg differentiating between regulatory capital, buffers and other capital not designated for default losses).

2.2.2 Rule-based loss allocation

Similar to rule-based loss allocations for default losses, some CCPs include in their rulebooks the potential allocation of losses to clearing members, most often for custody and investment losses. However, some CCPs also use rule-based loss allocation mechanisms to address losses arising from general business risk, operational risk and legal risk. In some instances, such allocations are used as a second-order resource after insurance coverage. As discussed further in Sections 3 and 5, some CCPs have developed frameworks to support an effective use of loss allocation. This includes a comprehensive and clear description of how losses would be allocated, the timing of any required payments to the CCP, and dedicated governance arrangements, to

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21 See PFMI Principle 15, Key consideration 2 (the amount of liquid net assets funded by equity "should be determined by [the CCP's] general business risk profile") and Key consideration 3 (a CCP should hold "sufficient liquid net assets funded by equity to implement [a viable recovery or orderly wind-down] plan").

22 This could motivate holding higher levels of own funds as a precautionary measure.

support clearing members in anticipating and preparing for potential exposures. Given the effects that these rule-based regimes would have on members, some CCPs ensure that there are sufficient opportunities for members to learn and understand the effects of these rules, which can improve transparency and buy-in from their participants.

2.2.3 External financing

To supplement internal sources of funds to address NDLs, many CCPs would plan to turn to external financing, either through debt or equity. Some CCPs rely on committed or uncommitted credit lines, which are sources of short-term liquidity. A number of CCPs would consider, in cases of more extreme need, other means of borrowing external funds (eg bond placements or issuance of commercial paper), in some cases with the aid of a parent. Some CCPs include plans to raise funds through public equity markets to address losses. Clearing members may also be a source of voluntary debt or equity financing, in exchange for consideration that might be negotiated when those resources are needed.

When it comes to uncommitted external financing, CCPs need to address two broad issues. First, the time taken to raise external funds through either debt or equity financing, which could take longer if the process involves obtaining regulatory approvals, could create liquidity gaps depending on when the NDLs crystallised.[23] Second, the reliability of this funding needs to be considered. For example, a CCP could be seeking such financing in a stressed environment when markets may be less liquid.

Some CCPs have ex ante commitments and specific plans and procedures for raising funds. For example, some reported maintaining committed credit lines for reliable short-term liquidity. Some also review and test the availability of committed or legally binding funding arrangements (for example, committed credit and repo facilities) on a regular basis. Another practice is to pre-register public offerings with the relevant securities regulator in order to accelerate the fund-raising process.

2.2.4 Insurance

Insurance is another tool that many CCPs use to cover NDLs. One feature of insurance is that it draws on funds external to the CCP and its clearing system. Almost all respondents report having insurance coverage to address losses from some non-default events. Use of insurance is particularly prevalent for legal and operational risk, but generally does not cover custody or investment risk. Some respondents also noted that the due diligence process undertaken by the insurer could be a useful cross-check on CCPs' approach to mitigating NDL risks.

A critical issue for CCPs is determining the specifics of insurance coverage. Some CCPs subject their insurance policies to regular reviews to evaluate the scope of coverage in conjunction with the NDL scenarios contemplated in their framework. To rely on an insurance policy to cover a particular loss event, CCPs confirm that the event would constitute a peril that is covered by, and not excluded from coverage under, the relevant insurance policy. This calls for a precise understanding of the policy's contractual terms. The policy terms also specify the amount of loss retained by the CCP and the limit of losses to be covered by the insurer; CCPs take steps to confirm that they will have resources sufficient to cover the retained loss and that the limit of losses to be covered by the insurer will be adequate. All of these factors are balanced against the cost of coverage, which CCPs reported to have increased significantly in recent years.

Typically, the insurance claim and payout process may take a considerable period of time, which could create liquidity gaps that CCPs need to keep in mind. Therefore, most CCPs consider insurance coverage as a means of loss absorption only in combination with other more reliably liquid resources such as own funds or lines of credit.

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23 See discussion in Section 2.3 below.

2.2.5 Replenishment

Principle 15, Key Consideration 5 of the PFMI calls for CCPs to "maintain a viable plan for raising additional equity should its equity fall close to or below the amount needed". This plan "should be approved by the board of directors and updated regularly". If a particular NDL event would exhaust or deplete own funds, CCPs should replenish them.

Some CCPs see risk identification, ongoing monitoring and appropriate escalation processes for breaches as central to achieving timely action on capital breaches, with plans for raising additional equity as part of recovery planning. Plans to raise capital vary across CCPs based on their specific characteristics. A few CCPs lack pre-established plans to replenish capital following an NDL event, which is inconsistent with the foregoing provision of the PFMI. Most CCPs have at least high-level dedicated arrangements in place. CCPs that are part of a larger corporate entity would typically first turn to intragroup support, for example from their parent company. This type of replenishment would appear likely to be most reliable when there are prior arrangements, such as legal guarantees from a parent company or at least established procedures for drawing on intragroup support. If intragroup support is not guaranteed, its provision could be affected by broader stress in financial markets that might occur at the same time that an NDL is realised, and that may also affect the relevant intragroup funding or liquidity provider. Some CCPs include plans to raise funds through public equity markets in order to replenish liquid net assets funded by equity. Clearing members may also be a source of equity replenishment.

Recovery plans are subject to a regular review and update process. As part of this process, the reliability of any capital-raising plan will be validated.

2.3 Planning for liquidity gaps

In the NDL context, liquidity gaps can arise where there are time constraints or delays in accessing funds from liquidity providers, members, the parent company or insurers, resulting in a mismatch between the time when losses from non-default events could materialise and the availability of the financial resources to cover them. During times of stressed market conditions, the severity and consequences of liquidity gaps can increase while a CCP's ability to close gaps may be reduced.

A practice at some CCPs is to confirm that the timelines for raising additional funds from either internal or external parties would correspond to the timing of their potential financing needs and to take steps to address any liquidity gaps. In this context, some CCPs have also considered that certain costs and potential losses relating to certain types of NDL event may crystallise more rapidly than those for other types of NDL event.

In survey responses, CCPs report that they use a combination of tools and resources to mitigate the risk of liquidity gaps. Some CCPs ensure that their own funds are prefunded, liquid and unrestricted in use (ie use is pre-approved by the board and not allocated to other losses). Regularly assessing the availability of the CCP's dedicated tools and resources is a critical step in assuring that the tools and resources to address NDLs correspond to the timing with which losses from non-default events are expected to materialise.

Most CCPs establish strategies for sources of financing, such as committed lines of credit or bridge loans from the parent company or from commercial banks.

The survey responses suggest that a few CCPs appear to have room for continued improvement in their approach to addressing funding or liquidity gaps. These include cases of (i) failure to identify available tools or resources to address potential funding and/or liquidity gaps; (ii) lack of awareness that funding and/or liquidity gaps may exist; (iii) exclusive reliance on central bank support to address liquidity (or possibly funding) gaps; and (iv) CCPs that are still in the process of developing liquidity plans.

The use of insurance raises specific issues regarding liquidity gaps (see Section 2.2.4). Assuming that a loss event is a covered peril, there is a time lag between the point at which the loss occurs and the point at which the insurance claim is paid. Some CCPs reported challenges in accurately forecasting the timing of the insurance claim adjudication and claim payouts. Other CCPs indicated that the required time for obtaining a decision and the release of funds may take several months. A CCP may choose to address the issue of uncertainty around the timing of insurance claim payouts by supplementing insurance coverage with bridging liquidity arrangements.

2.4 Ensuring that NDL exposures are covered by available resources and tools

CCPs engage in a variety of practices to ensure that NDL exposures are covered by available resources and tools both from a credit perspective (ie total exposures will be covered by total resources and tools) and from a liquidity perspective (ie considering the CCP's liquidity resources and tools, sufficient resources will be promptly available when exposures materialise). As discussed in Section 2.1.1, some CCPs conduct an analysis of the specific non-default risks and loss exposures associated with the CCP's particular business. Some CCPs also conduct a rough quantitative analysis of whether the types and amounts of available resources and tools would meet the CCP's potential funding needs as regards both amount and timing. This practice may be more helpful than an analysis of the adequacy of available resources that is limited to a high-level qualitative approach.

Some CCPs estimate potential funding and liquidity gaps in severe stress scenarios. For example, one CCP compares stress scenarios with 80% of available resources, seeking to achieve the result that 80% of available resources is sufficient to cover any single event that the CCP estimates might occur at least once in 1,000 years, any two events that the CCP estimates may occur at least once in 100 years, and any three events that the CCP estimates may occur at least once in 20 years. Another approach is to specify the order in which the CCP's tools and resources would be used to address each type of NDL event.

2.5 Orderly wind-down planning

As discussed above, a CCP's identification of NDL scenarios and its quantification of NDLs may support adequate planning to address NDLs with available tools and resources in a timely manner. However, Principle 3, Key Consideration 4 of the PFMI also states that a CCP should prepare appropriate plans for its orderly wind-down. As noted in the CPMI-IOSCO Recovery Guidance, "where [a recovery] 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".[24]

CCPs adopt a range of practices in this area. Some CCPs do little planning for an orderly wind-down resulting from NDLs, providing a variety of rationales for this approach. For example, some CCPs place more emphasis instead on ensuring that recovery measures for NDLs are effective, some highlight the maintenance of regulatory capital requirements to ensure they are well placed to meet NDL events and others referenced resolution plans that their authorities have in place.

CCPs that have in place more detailed plans for orderly wind-down use a variety of approaches to estimate the associated costs. Some use a basic approach to estimate the time frame and resources needed to conduct an orderly wind-down based on their usual operating expenses. Other CCPs engage in a more structured approach and take costs specific to a wind-down into account when quantifying the necessary resources. These wind-down-specific adjustments can include estimates of additional costs for retaining critical staff, increases in professional fees that are particularly relevant to the wind-down process (eg legal and accounting fees) and losses from the early termination of operating contracts. Cost savings may be realised due to reduction in non-critical operations.

In addition to adjustments to wind-down costs, some CCPs also consider other financial impacts that an orderly wind-down will have on their business. Some assume reduced revenues during the orderly wind-

[24] See CPMI-IOSCO Recovery Guidance, paragraph 2.2.2. CCPs are called upon to have both recovery plans and plans for orderly wind-down. Neither is a substitute for the other.

down period to reflect the possibility of business losses. Meanwhile, if the wind-down fails to proceed as expected, additional resource needs may arise. Some CCPs plan for additional financial resources or funding sources or tools (such as close-out netting authority) to be available to address a disorderly wind-down.

3. Achieving the operational effectiveness of plans to address NDLs

In addition to developing ex ante approaches for quantifying potential NDLs and assessing resource sufficiency, CCPs also evaluate the operational effectiveness of their plans for NDLs, including in the context of recovery and orderly wind-down. The CPMI-IOSCO Recovery Guidance states that "the recovery plan should contain (or be complemented by) procedures or other arrangements designed to ensure that the recovery tools can be implemented practicably, effectively and in a timely manner for each of the scenarios identified in the recovery plan".[25] In evaluating the effectiveness of their plans, CCPs may consider the factors that would make it more or less likely that the approach will have the intended results.

Although the factors considered by a CCP vary depending on its particular approach, some common factors influence its effectiveness, such as legal enforceability, due diligence and ongoing monitoring of third-party service providers, and participant understanding. Principle 1 of the PFMI requires a CCP to have a "well-founded, clear, transparent and enforceable legal basis for each material aspect of its activities in all relevant jurisdictions". However, the lack of historical incidence (and, thus, lack of experience) with extreme NDLs means that the legal basis of many tools for addressing NDLs has never been tested in practice. To the extent that an aspect of the CCP's plan or of a specific rulebook provision is contested during an NDL event, time and resources may be diverted away from addressing the NDL while enforceability is determined.

Moreover, Principle 23 of the PFMI sets forth that a CCP "should provide sufficient information to enable participants to have an accurate understanding of the risks, fees and other material costs they incur by participating in the [CCP]". As discussed in detail in Section 5 below, the CCP's stakeholders' knowledge and understanding of the actions the CCP may take during an NDL scenario can contribute importantly to the effectiveness of the CCP's plans to address NDLs. Moreover, a CCP's plans will often rely upon the performance of relevant third parties such as service providers and liquidity providers. Some CCPs take an expansive view of what constitutes a third-party service provider requiring heightened due diligence in order to include providers of critical infrastructure, supporters of key operations, any third party that connects to a CCP's infrastructure, any third party that has access to critical CCP data and any third party that would support the CCP during recovery. Thus, the proper identification, understanding and preparedness of these relevant third parties is also important to the effectiveness of the plans.

Some CCPs take steps to ensure that their participants and relevant third parties are prepared for the processes and requirements that are triggered by an NDL scenario. CCPs focus these efforts on both third parties that could cause an NDL and third parties that will be relied upon to support a CCP in recovery from an NDL event. Practices include ensuring transparency in contracts and rules as well as active engagements and exercises with stakeholders. With respect to third parties, some CCPs have dedicated functions within their risk management that focus on assessing and addressing third-party risks. In some jurisdictions, the regulatory framework requires CCPs to monitor integrated third-party service providers closely as part of their business continuity management efforts. Some of the ongoing monitoring activities will differ based on whether the third party is providing technical services or financial services. For example, some CCPs focus on monitoring key performance indicators for technology or operations service providers, and also focus on credit monitoring, performance capacity under stressed scenarios and concentration risk monitoring through the imposition of exposure limits. Some respondents urge diligence with respect to risks that may flow back to the CCP from third-party financial service providers such as CSDs or settlement banks. These practices help ensure that a CCP's participants and relevant third parties have a clear understanding of the requirements or any actions they are expected to take during an NDL scenario. NDLs are typically non-routine, and many extreme NDL

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[25] See CPMI-IOSCO Recovery Guidance, paragraph 2.3.9.

events may be unprecedented. There is a risk that a CCP's participants and relevant third parties may not focus on or prepare for those requirements and actions until the event has already occurred.

There may be constraints on the use of a certain tool, such as whether it is prohibited under the applicable regulatory framework, is based on unsettled law, presents unacceptable risks upon deployment, is contingent on a sequence of other tools or is highly complex in its implementation. Where CCPs, participants and relevant third parties have a clear understanding of those constraints, they may be able to collaborate in developing other tools to close any gaps, thereby promoting the result that the relevant tools are effective, as called for in the CPMI-IOSCO Recovery Guidance.[26] A tool is only effective if it is available at the time or in the manner that it is needed. The CPMI-IOSCO Recovery Guidance observes that there should be a high degree of certainty that the CCP will be able to implement each tool in all relevant circumstances, including in times of stress.[27]

CCPs have reported practices, procedures and plans in place to achieve operational effectiveness during NDL scenarios. These include plans and tools to address NDLs in CCP rules and other contracts, identifying the order in which tools are to be used for each type of NDL risk and using technology to support the NDL framework.

3.1 Setting out plans and tools to address NDLs in CCP rules and other contracts

A CCP that relies on plans with legally binding rules and procedures can reduce potential legal uncertainty and expedite processes carried out in response to an NDL. CCPs mitigate legal risk by setting out tools to address NDLs in contracts, rules or plans that have been already recognised as containing binding provisions, for which the path to enforceability is known or proven, including in more than one jurisdiction. Many CCPs have written agreements in place with third-party service providers that address the respective obligations of each party in certain respects. These provisions include the CCP's right to terminate the contract under certain scenarios; the right to audit the provision of services; the right to receive prompt notification of any service disruption or incident; the ability to examine whether the third-party service provider is adhering to its own risk mitigation frameworks, including for cyber risk; or the right to receive mitigation if services become unreliable. Some CCPs set out loss allocation mechanisms for certain types of NDL (in particular, investment or custody losses) in their rulebooks in order to address these losses effectively. Some CCPs would immediately begin the process of allocating losses once an NDL materialises, while others would expect to rely first on other tools, such as their own funds.

Some CCPs reported going further in developing plans and procedures to address NDLs with specified funding sources, ie prefunded own funds (regulatory capital and additional reserves), and own funds stemming from voluntary recapitalisation or financing debt (credit lines, financing repo and financing from central banks).

3.2 Identifying the sequencing of tools for each type of NDL scenario

Many CCPs report that they specify the order in which tools or resources would be used to address each type of NDL scenario, with certain tools more likely to be used for certain risks. For example, many CCPs identify liquid net assets funded by equity as the first tool used for general business risk losses, whereas insurance coverage is often the first tool relied upon for operational risk losses.[28] Certain CCPs may be bound by specific regulatory requirements or industry standards with respect to the order or amount of tool use. Such restrictions

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26 See CPMI-IOSCO Recovery Guidance paragraphs 3.3.1 and 3.3.5.

27 See CPMI-IOSCO Recovery Guidance paragraph 3.3.5.

28 As noted above, CCPs that rely upon insurance will generally have liquidity arrangements to address the time necessary for insurance claims to be paid.

may include requiring a CCP to accept a first-loss position for specific types or categories of NDL (eg where the CCP is assigned primary risk management responsibility).

3.3. Using technology to support the management of NDLs

Several CCPs also reported using information technology systems and processes to support their management of NDLs, specifically to facilitate loss allocation during an actual NDL event. Some CCPs use existing technological tools (ie clearing systems and communication methods) for the management of operational risks that could cause NDLs. Recovery instruments such as cash calls are expected to be applied via the CCPs' clearing systems. Similarly, communications with respect to the use of recovery tools can be carried out through established communication processes. Information technology systems and processes are planned to enable CCPs to calculate and communicate, accurately and promptly NDL amounts and their allocation to the relevant participants or third parties in accordance with CCP rules or other contractual arrangements.

4. Reviewing, exercising and testing plans for NDLs

The CPMI-IOSCO Recovery Guidance[29] provides the following: "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. The FMI should update its recovery plan as needed following the completion of each test and review."

In general, responding CCPs perform annual reviews of their recovery plans, which include an assessment of the sufficiency of tools and resources to address NDLs. Almost all responding CCPs conduct crisis management drills.[30] A few of those that had not yet conducted crisis management exercises addressing NDL scenarios acknowledged the importance of this type of testing and reported that they plan to commence such testing once their crisis simulation programmes are more mature. CCPs report conducting operations-based crisis management exercises, which involve drills and other exercises, as well as discussion-based crisis management exercises, which consist of tabletop exercises and workshops. The scenarios tested generally include the major categories of business and operational risks that could generate NDLs.[31]

Some responding CCPs use crisis management drills to improve their decision-making capabilities and their capacity to address potential NDLs by improving their understanding of scenarios and tools and testing assumptions about the effectiveness of specific tools. For example, one CCP highlighted that the results of its crisis management exercises had helped improve its decision-making processes and operational readiness, as well as identified the need for higher insurance coverage. In some cases, CCPs test their response to circumstances where their tools and resources can only partially cover the resulting financial losses.

Some CCPs have participated in industry-led multi-CCP crisis management drills in the past. This practice recognises the significant interlinkages and dependencies between individual CCPs and may be extended to address additional NDL scenarios and build on efforts to foster coordinated crisis management across CCPs.

Some CCPs may conduct tests on their ability to draw upon liquidity providers under bank credit arrangements (including repo) and non-bank repo facilities. Some CCPs also test their ability to liquidate

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[29] See CPMI-IOSCO Recovery Guidance paragraph 2.3.8.

[30] Conducting these drills is in line with PFMI Principle 17, Key Considerations 2 and 6 and paragraph 2.3.8 of the Recovery Guidance. These exercises typically simulate management responses to various scenarios that include cyber attacks and other external (eg power outages) or internal (eg system malfunction) events.

[31] These preparations may help mitigate NDLs and could help CCPs to restore normal operations promptly.

financial assets and conduct due diligence and legal reviews to ensure access to assets in the event of a custodian bank's default.

In addition, some CCPs engage in a discussion-based exercise, which involves testing the roles and responsibilities of both the internal governance structure and external partners and stakeholders. This practice appears to facilitate an understanding of roles and responsibilities before a crisis occurs. Such considerations may serve to reduce the likelihood of purely ad hoc decision-making on the allocation of NDLs in a crisis, while still giving decision-makers the flexibility to respond to the unique circumstances of any particular crisis.

CCPs typically reported that they include a wide range of internal stakeholders and, in some cases, external stakeholders (including participants, regulators and other FMIs) in crisis management drills despite some obstacles in terms of confidentiality and security. This practice may strengthen the tie between the exercise and the reality of how stakeholders will react. Some CCPs go further and hold discussions to review the results of crisis management exercises with participants who have participated in the exercises. Furthermore, some CCPs collect input from key internal and external stakeholders to inform the design and conduct of future simulations.

These practices may permit CCPs to enhance the tools and resources for identifying, measuring, monitoring and managing NDL risks. Such practices have the potential to increase participants' understanding of the types of scenario that could generate NDLs, the range of magnitudes of such losses, and their roles and responsibilities in addressing NDLs. All this could increase the operational effectiveness of a CCP's plans to address NDLs.

5. Providing effective governance of and transparency regarding plans for NDLs and engaging with participants and authorities

5.1 Providing effective governance in planning for NDLs and in executing plans

Principle 2 of the PFMI states that "an FMI should have governance arrangements that are clear and transparent, promote the safety and efficiency of the FMI, and support the stability of the broader financial system, other relevant public interest considerations and the objectives of relevant stakeholders".[32] The CPMI-IOSCO Recovery Guidance also notes that "the FMI should have an effective governance structure and sufficient resources to support the recovery planning process and implementation of its recovery plan, including any decision-making processes".[33] The guidance further notes that "an FMI's governance arrangements should provide for timely and effective implementation of its recovery plan, including documented decision-making processes in a crisis".[34]

Governance arrangements that are well , clear and documented are a critical component of effective management of risks, including NDLs. Strong and effective governance arrangements are necessary on an ex ante basis to ensure that well-designed and comprehensive plans to address NDLs effectively are in place. They

[32] PFMI Principle 2, Key Consideration 2 further provides that "an FMI should have documented governance arrangements that provide clear and direct lines of responsibility and accountability". A careful consideration of NDL risks is also important in the context of implementing Key Consideration 6 of PFMI Principle 2, which sets out that "the board should establish a clear, documented risk-management framework that includes the FMI's risk-tolerance policy, assigns responsibilities and accountability for risk decisions, and addresses decision-making in crises and emergencies". Key Consideration 7 of PFMI Principle 2 calls for the "board [to] ensure that the FMI's design, rules, overall strategy and major decisions reflect appropriately the legitimate interests of its direct and indirect participants and other relevant stakeholders".

[33] See CPMI-IOSCO Recovery Guidance paragraph 2.3.3.

[34] See CPMI-IOSCO Recovery Guidance paragraph 2.3.9.

are also necessary during an NDL event to ensure that, to the greatest extent practicable, those plans can be executed properly and the situation resolved successfully.

CCPs generally set out specific formal approaches for addressing NDLs and for the review of the underlying assumptions and methodologies by senior management and ultimately the board.[35] This typically includes processes for developing and executing plans for addressing NDLs both in normal times and in recovery, as well as for reviewing such plans. Respective arrangements may be included in CCPs' rulebooks and/or recovery plans, or the CCP's management or board may have broader discretion. Some CCPs foster preparedness by distinguishing between arrangements and responsibilities for decision-making in normal times and in recovery. Some CCPs review their plans for addressing NDLs on at least an annual basis.

Some CCPs also take steps to define the timing, rules, procedures and governance arrangements for using specific tools for funding or loss allocation (eg rule-based loss allocation or obtaining additional own funds). This may relate to the decision to use a certain tool, the extent to which and the way in which the tool will be used, and to notifying affected entities. Many CCPs give management wide discretion on which tools should be used in any particular NDL scenario, while some CCPs establish an ex ante hierarchy of tools contingent on the type of NDL involved, while still maintaining flexibility in the overall approach to NDLs.

Some CCPs have established specific governance arrangements for allocating NDLs to clearing members. For example, some CCPs would require approval from the board or parent company; a few CCPs also foresee regulatory authorisation. Some CCPs have defined concrete time frames for allocating losses and obtaining financial resources from clearing members (often very quickly, eg immediately, within one hour or within 24 hours).

In addition, some CCPs have in place clear governance for the orderly wind-down process for NDL scenarios. This includes a framework for the formal responsibilities and discretion of the board in initiating wind-down, considering public interest concerns, and consulting and communicating with relevant authorities.

Some CCPs have processes for senior management to review the results of crisis management exercises discussed above in order to take steps to incorporate the lessons learnt into improving the tools and resources available to address NDLs, thereby refining their processes.

5.2 Providing transparency to participants

PFMI standards for transparency and disclosure that apply to FMIs, including CCPs, are also relevant in the context of NDLs. Principle 23 of the PFMI sets forth the following: "an FMI should have clear and comprehensive rules and procedures and should provide sufficient information to enable participants to have an accurate understanding of the risks, fees and other material costs they incur by participating in the FMI. All relevant rules and key procedures should be publicly disclosed."[36] Specifically, in the context of recovery, the CPMI-IOSCO Recovery Guidance states the following: "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."[37] Accordingly, participants should have an accurate understanding of the risks they face from participating in a CCP, including risks arising from NDLs.

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[35] See PFMI EN 3.3.3.

[36] PFMI Principle 23, Key Consideration 2 explains that "an FMI should disclose clear descriptions of the system's design and operations, as well as the FMI's and participants' rights and obligations, so that participants can assess the risks they would incur by participating in the FMI". Key Consideration 3 of PFMI Principle 23 further describes that an FMI should "provide all necessary and appropriate documentation and training to facilitate participants' understanding of the FMI's rules and procedures and the risks they face from participating in the FMI".

[37] See CPMI-IOSCO Recovery Guidance paragraph 2.3.9.

Many CCPs share their practices, assumptions and methodologies for quantifying and addressing NDLs with participants; some do so through their PFMI disclosures. CCPs with a banking licence additionally reported making disclosures under Pillar 3 of the Basel framework. Other CCPs use disclosure in their financial statements or annual report, pursuant to other regulatory requirements. Such reports can be a helpful means of disclosure if there is sufficient granularity, and thus transparency, in the aggregate, "so that participants can assess the risks they would incur by participating in the FMI".[38]

Some CCPs publish additional information and documents on their websites. Some CCPs publish on their websites information regarding tools that have a direct impact on market participants, making their rulebooks and circulars publicly available. Such publications can be a helpful means of disclosure to participants provided that such information is comprehensive and easily accessible on the CCP's website. Some CCPs solely rely on publication on their website to disclose their frameworks for NDL risks to participants. If such disclosures are too high-level, they may not provide the level of transparency participants need to assess fully the risk of financial losses from the non-default events faced by the CCP.[39]

Several CCPs consider sharing recovery plans and other regulatory filings to be an effective form of disclosure to participants. However, the amount of information shared with participants during the regulatory filing process varies. These CCPs also look at corporate governance structures as sources of disclosure, looking to risk committees that may include clearing member, exchange and client representation. While it is possible that these disclosures may provide some participants with sufficient transparency regarding the CCP's NDL risks that may affect them, disclosures to a limited set of participants do not appear to be an effective means of providing transparency to all participants. While some participants may be represented within these governance structures and their representatives may have access to information, those representatives may be subject to confidentiality obligations that limit the information that they may share. Moreover, many other participants have neither representation nor access to NDL risk information. If recovery plans, other regulatory filings and corporate governance structures are the sole forms of disclosure used by some CCPs, some participants may not have adequate transparency regarding the risk of NDLs.

The majority of CCPs use loss allocation as a tool to address certain types of NDL, in particular custody and investment losses, based upon the respective rights of clearing members and the CCP, as outlined in CCPs' rulebooks. Some CCPs provide a comprehensive description of the way in which NDL losses would be allocated. This can include transparency regarding the applicable rules, procedures and governance arrangements. As the CPMI-IOSCO Recovery Guidance notes, "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".[40]

Some CCP rulebooks clarify the types of NDL that could be passed on to clearing members and the circumstances in which loss allocation would be used to address NDLs. In this context, some CCPs have defined trigger requirements (eg the required magnitude of the loss or the order in which rule-based loss allocation may be used in relation to other tools).

Some CCPs have defined upper limits or caps on the amount of losses that the CCP could pass on to clearing members, calibrated separately for each type of NDL event. This helps to ensure that clearing member obligations are transparent, measurable, manageable and controllable. However, not all CCPs have defined such upper limits.

Some CCPs foresee that rule-based loss allocation would be used in line with broader objectives, such as the stability of the broader financial system and the safety of CCPs' participants. However, unless such

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38 See PFMI Principle 23, Key Consideration 2.

39 See generally PFMI EN 3.23.9: "An FMI should make the relevant information and data it discloses as set forth in this report readily available through generally accessible media, such as the Internet [...] The data should be accompanied by robust explanatory documentation that enables users to understand and interpret the data correctly."

40 See CPMI-IOSCO Recovery Guidance paragraph 3.3.1.

objectives are specified in concrete terms, it may not be sufficiently predictable to clearing members how the inclusion of such objectives may affect them.

5.3 Engaging directly with participants and authorities

CCP engagement with participants and relevant authorities is also important in the context of NDLs, and it is an effective means of building both the CCP's understanding of the interests of its participants and relevant authorities as well as the participants' and authorities' understanding of the CCP's plans.

A few CCPs do not currently seek input on their NDL frameworks from participants and have no plans to do so. Others seek input only from the larger participants. Some CCPs use their corporate governance and reporting structures as a means of receiving input from participants.

As with disclosure, if the governance structure is the sole means by which the CCP is seeking participant input, the CCP may be excluding some relevant participants by not providing all participants with the means to provide feedback effectively. Accordingly, CCPs' use of corporate governance and reporting structures can be an effective means of receiving participant feedback when used in conjunction with another means of receiving input that is available to all participants, such as direct contact.

Some CCPs engage directly with participants, either individually or as a group. This serves as a means of communicating their practices, assumptions and methodologies for quantifying and addressing potential NDLs, collecting input from participants on their views regarding potential NDL risk management and loss allocation, and supporting clearing participants in preparing for their respective contractual obligations. Such direct contact ties in with clearing members (eg banks) fulfilling their regulatory due diligence requirements with respect to their potential obligations and exposures to the CCP. In addition, some CCPs take steps to confirm that clearing participants are familiar with their obligations in NDL scenarios and prepared to meet them as laid out in the CCP's recovery plans or rulebooks, including loss allocation rules. For example, one CCP conducted outreach with all participants and engagement with external industry stakeholders when considering changes to loss allocation rules for NDLs and holds an annual session with participants to provide information on recovery and orderly wind-down planning, including how the CCP would address NDLs. While the provision of detailed information and direct contact with participants may be a resource-intensive form of disclosure and seeking input, it may be an effective means of helping participants to understand the risks and potential costs they face from CCP NDLs, as well as enhancing the reliability of tools to address NDLs through facilitating participants' preparation to meet their obligations. To the benefit of both CCPs and clearing participants, this may foster plans that are operationally effective in addressing NDLs, as discussed in Section 3.1.

Some CCPs hold discussions on practices, assumptions and methodologies for quantifying and addressing potential NDLs with CCP supervisors and/or the resolution authority in order to take into account local requirements and the uniqueness of the markets the CCP serves. Finally, many CCPs share their recovery plans and other regulatory filings with the supervisor for their inputs on the adequacy of the plan.

There is an important linkage between transparency, feedback from participants and authorities, governance and effectiveness: effective transparency concerning the impact on participants of a CCP's plans to address NDLs fosters understanding among its participants and thus better prepares them to meet their obligations under those plans. It also helps participants to provide feedback concerning those plans, communicating potential difficulties to the CCP's governance structure. This in turn helps the CCP to "ensure that the FMI's design, rules, overall strategy and major decisions reflect appropriately the legitimate interests of its direct and indirect participants and other relevant stakeholders"[41] and, as appropriate, to mitigate misunderstandings, adapt those plans or clarify participants' obligations.

[41] See PFMI Principle 2, Key Consideration 7.