

# Skin in the Game – Central Counterparty Risk Controls and Incentives

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The increasing systemic importance of central counterparties (CCPs) has seen recent policy debates focus on the ability of CCPs to withstand a crisis effectively. CCPs maintain prefunded financial resources to cover the potential losses arising from the default of a clearing participant. This article discusses the incentives created by the composition of these resources, and draws out the role of transparency and governance in ensuring these incentives are effective.

## Introduction

CCPs play a key role in managing post-trade risks in financial markets. A CCP stands between the counterparties to a financial market trade and makes good on the obligations that each has to the other under the terms of that trade. As a result, participants in a centrally cleared market are not directly exposed to credit or liquidity risks arising from the party on the other side of a trade. Instead, participants create exposures directly with the CCP through the process of novation.<sup>1</sup>

The role CCPs have played in the functioning of financial markets has increased in importance since the global financial crisis.<sup>2</sup> Recognition of the benefits of central clearing has driven reforms in a number of jurisdictions to encourage the use of CCPs in over-the-counter (OTC) derivatives markets, including requirements for the mandatory central

clearing of certain OTC derivatives transactions.<sup>3</sup> A number of CCPs operating in global OTC derivatives markets are systemically important in several jurisdictions.

In line with their growing systemic importance, international standards on risk management of CCPs have been strengthened through the release of the *Principles for Financial Market Infrastructures* (the Principles) by the Committee on Payment and Settlement Systems (CPSS, now the Committee on Payments and Market Infrastructures (CPMI)) and the International Organization of Securities Commissions (IOSCO) (CPSS-IOSCO 2012a). As part of this, requirements for CCP recovery tools have been introduced to promote continuity of critical CCP services in periods of extreme stress.<sup>4</sup> To maintain the continuity of critical services in the event that these recovery tools prove ineffective, jurisdictions have also begun to implement resolution regimes for CCPs.<sup>5</sup>

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1 Novation is the process whereby the contract between the original parties to a trade is replaced by two contracts: one between the buyer and the CCP; and one between the seller and the CCP.

2 CFR (2011) discusses the role of CCPs, the risks they manage and the benefits of central clearing in the Australian context in further detail.

3 Australia has also passed legislation to provide for mandatory central clearing of certain derivatives products, in line with the Leaders' Statement from the 2009 G20 Pittsburgh Summit (G20 2009).

4 CPMI-IOSCO issued guidance on CCP recovery tools in its October 2014 report, *Recovery of Financial Market Infrastructures* (CPMI-IOSCO 2014).

5 The Financial Stability Board published guidance on the application of the 'Key Attributes of Effective Resolution Regimes for Financial Institutions' to CCPs in October 2014 (FSB 2014).

Nevertheless, the increasing systemic importance of CCPs has seen recent policy debates focus on the ability of CCPs to withstand a crisis effectively (JP Morgan Chase & Co 2014; LCH.Clearnet Group 2014; CME Group 2015; Cœuré 2015; Tarullo 2015). Some have argued that consideration should be given to the need for additional or more detailed regulatory requirements, including the need to specify the amount of a CCP's capital (the CCP's 'skin in the game') that is allocated to meet losses in the event of a participant's default, and to increase the total loss-absorbing capacity of CCPs, for example by creating dedicated CCP recapitalisation funds (JP Morgan Chase & Co 2014). Regulators have acknowledged the need to examine these issues further and will do so as part of a detailed work program on CCP resilience, recovery and resolution to be progressed over the coming year (Cœuré 2015; FSB 2015). Any proposals will have to be considered in the context of the incentives they create for the prudent risk management of a CCP, from the perspective of both the CCP and its clearing participants.

This article discusses how incentives can depend on the composition of a CCP's prefunded financial resources, which are maintained to cover the potential losses arising from a clearing participant's default. The discussion is restricted to CCPs that are listed companies, since this is the prevailing ownership structure for most current CCPs.<sup>6</sup> The size of a CCP's contribution to its total prefunded resources must appropriately balance the incentives for prudent risk management between a CCP and its participants. However, the effectiveness of these incentives in delivering a sound risk management framework ultimately depends on how much control each party has over a CCP's risk management framework. A CCP's risk management framework must therefore be transparent, available to all stakeholders and have governance arrangements in place that enable stakeholders to assert appropriate influence over its settings.

6 CCPs can also be user owned.

## CCP Risk Controls

In the normal course of business a CCP maintains a matched book, as it stands between counterparties with opposite positions, and is not exposed to market risk. However, in the event of a clearing participant default, the CCP must continue to meet its obligations to its surviving participants and the CCP faces potential losses until such time as it can close out its exposures arising from the default.<sup>7</sup> These exposures arise from changes in the value of a defaulted participant's contracts with the CCP. CCPs apply a range of risk controls to manage potential losses in such a default event. These risk controls typically fall into three categories:<sup>8</sup>

- **Margin:** a 'defaulter-pays' resource whereby each clearing participant posts collateral to cover the risks associated with its positions with the CCP. Margin can usually only be accessed by the CCP in the event of default by the posting participant (i.e. margin posted by one participant cannot be used to cover losses arising from the default of another – it is not 'mutualised'). CCPs use variation margin to cover current exposures, with margin collected from those clearing participants with mark-to-market losses and paid out to those with mark-to-market gains. CCPs also collect initial margin to cover potential future exposures – the risk of adverse price changes from the time of the last variation margin payment to the time at which a defaulted participant's positions can be closed out (the close-out period). CCPs often also collect additional margins, for example to cover heightened risks associated with liquidating large or concentrated positions.

7 This article focuses on potential losses arising from a participant default. A CCP may also face risks outside of its core clearing business (such as general business risk). To the extent that a CCP does face such risks, the CCP is required to hold capital against these risks under the Principles (and the Reserve Bank's corresponding Financial Stability Standards for Central Counterparties: see RBA (2012)).

8 These risk controls build on the framework discussed in Carter, Hancock and Manning (forthcoming), which also covers the *ex ante* risk controls CCPs apply to manage their exposures (e.g. participation requirements).

- Pooled prefunded financial resources: predominantly ‘survivor-pays’ resources, which are used in cases where margin posted by the defaulted clearing participant is insufficient to cover losses. Pooled prefunded financial resources, commonly known as a ‘default fund’ or ‘guaranty fund’, typically comprise prefunded mutualised contributions from clearing participants and prefunded contributions from the CCP. The total value of a CCP’s prefunded pooled resources is generally calibrated to cover the losses faced by the CCP in the event of the default of the participant with the largest exposures (or, in the case of CCPs that are systemically important in multiple jurisdictions, the two participants with the largest exposures) in ‘extreme but plausible’ financial conditions.
- Recovery tools: prefunded pooled financial resources are commonly supplemented with *ex post* promissory contributions from clearing participants, known as ‘assessments’. To ensure that losses can be allocated comprehensively, CCPs are also increasingly introducing additional loss-allocation tools, such as haircutting of participants’ variation margin gains.<sup>9</sup>

The sequence in which a CCP applies these risk controls – from margin through to pooled prefunded resources and recovery tools – is known as the CCP’s ‘default waterfall’. The combined value of these resources defines the value of losses arising from a participant default that a CCP could absorb without entering into insolvency.

## Regulatory requirements

The CCP risk management controls described above are formalised by the CPSS-IOSCO Principles. The Principles establish a set of minimum requirements for CCPs, which are designed to promote the safe and efficient provision of CCP services, limit systemic risk, and foster transparency and financial stability.

<sup>9</sup> For further discussion of recovery tools, see CPMI-IOSCO (2014) and Gibson (2013).

In particular, the Principles include minimum loss absorbency requirements related to a CCP’s default waterfall, to enable a CCP to deal effectively with the default of one or more participants. Reflecting the importance of defaulter-pays protections, a CCP is required to collect initial margin from its clearing participants to cover at least 99 per cent of the estimated distribution of potential future exposures during the close-out period.<sup>10</sup> A CCP is also required to maintain a prefunded buffer of financial resources to cover additional losses that could arise if a large participant were to default in stressed market conditions. CCPs that are systemically important in multiple jurisdictions or that clear complex products such as credit default swaps must hold additional financial resources to cover the default of any two participants.<sup>11</sup>

Although there are no minimum requirements on the composition or order of use of a CCP’s prefunded resources, or any explicit requirements regarding the inclusion of a CCP’s own funds in the default waterfall, the Principles do acknowledge the importance of the incentives created by the composition of a CCP’s default waterfall. In providing for discretion in the composition of a CCP’s default waterfall, the Principles seek to allow for a variety of CCP structures and operating environments. In implementing the Principles in their respective jurisdictions, a number of authorities have allowed for similar discretion.

By contrast, the harmonised regulatory framework for CCPs in the European Union (EU) – the European Markets Infrastructure Regulation (EMIR) – explicitly addresses the inclusion of a CCP’s own funds in the default waterfall.<sup>12</sup> Under EMIR, a CCP is required to contribute a minimum amount of capital to the default waterfall that is at least 25 per cent of its

<sup>10</sup> Under the Principles, CCPs must also exchange variation margin to regularly mark clearing participants’ positions to market.

<sup>11</sup> All Australian CCPs and overseas CCPs licensed to provide clearing services in Australia are subject to this requirement.

<sup>12</sup> Regulation (EU) Number 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories.

minimum regulatory capital requirement.<sup>13</sup> EMIR also stipulates that these resources must be drawn before the default fund contributions of non-defaulting clearing participants, in the event that a defaulted participant’s margin and other contributions were exhausted.

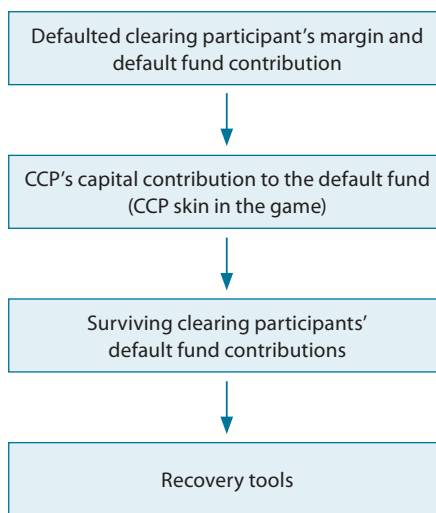
Similarly, in the context of an application by domestic CCPs – ASX Clear and ASX Clear (Futures) – for recognition in the EU, the Reserve Bank has issued a supplementary interpretation of its Financial Stability Standards for Central Counterparties ((CCP Standards) which implement the Principles in Australia). This supplementary interpretation applies to domestically licensed CCPs in Australia that offer clearing services to clearing participants that are either established in the EU or subject to EU bank regulation (RBA 2014). The interpretation clarifies the Bank’s expectation that a CCP’s own resources should make up a material proportion of its pooled financial resources. In addition, a sufficient proportion of such resources should be drawn first in the event that a defaulted participant’s margin and other contributions were exhausted.

**CCP risk management in practice**

In practice, a number of CCPs apply default waterfalls of a similar structure. In a typical default waterfall, illustrated in Figure 1, losses arising from a clearing participant default would initially be absorbed using the defaulted participant’s margin and its contribution to the default fund. If these defaulter-pays resources were insufficient, remaining losses would be applied first to the CCP’s capital contribution to the default fund, followed by the mutualised contributions of the surviving clearing participants. Any remaining losses would be covered using the CCP’s recovery tools, for example assessments called from the CCP’s clearing participants.

A number of CCPs, including Chicago Mercantile Exchange Inc. (CME Inc.), Eurex Clearing, ICE Clear

**Figure 1: Typical CCP Default Waterfall**



Source: RBA

Credit and LCH.Clearnet Limited (LCH.C Ltd), apply such a waterfall (Table 1). However, the default waterfall described above is not applied universally. Some CCPs build on the typical waterfall by applying additional layers. For example, ASX Clear (Futures) breaks participant contributions to the default fund into two tranches and would apply additional rounds of CCP capital after each tranche was exhausted. Also, Japan Securities Clearing Corporation (JSCC) would apply a second round of CCP capital concurrently with surviving participants’ contributions. Other CCPs depart more significantly from the typical default waterfall, perhaps for legacy reasons or due to the nature of the markets cleared, the participant base or the ownership structure of the CCP. Examples include ASX Clear, which does not collect participant contributions, and the US-based Options Clearing Corporation, which excludes CCP capital from the waterfall.

A further, highly publicised example is the Korean CCP KRX. The default of a clearing participant in December 2013 resulted in losses that exceeded the defaulter’s collateral and, in accordance with KRX’s rules, remaining losses were allocated to the default fund contributions of surviving participants (ISDA 2014).

<sup>13</sup> Under EMIR, CCPs must hold capital against each of the following risks: operational and legal risks; credit, counterparty and market risks; business risks; and wind-down or resolution.

**Table 1: CCP Default Waterfalls<sup>(a)</sup>**

CCP	Jurisdiction	Total pre-funded pooled resources <sup>(b)</sup>	
			Millions
ASX Clear	Australia	ASX Clear capital:	A\$250
ASX Clear (Futures)	Australia	ASX Clear (Futures) capital:	A\$120
		Participant contributions, first tranche:	A\$100
		ASX Clear (Futures) capital:	A\$150
		Participant contributions, second tranche:	A\$100
		ASX Clear (Futures) capital:	A\$180
CME Inc. Base service	United States	CME Inc. capital:	US\$100
		Participant contributions:	US\$3 338
CME Inc. Interest Rate Swaps service	United States	CME Inc. capital:	US\$150
		Participant contributions:	US\$2 473
Eurex Clearing	Germany	Eurex Clearing capital:	€50
		Participant contributions:	~€3 340
ICE Clear Credit	United States	ICE Clear Credit capital:	US\$50
		Participant contributions:	US\$1 834
JSCC Interest Rate Swaps service	Japan	JSCC capital:	¥2 000
		Participant contributions:	¥39 800
		Additional JSCC capital:	¥2 000 <sup>(c)</sup>
LCH.C Ltd SwapClear service	United Kingdom	LCH.C Ltd capital:	£30
		Participant contributions:	£2 726

(a) As at: end December 2014 for Eurex Clearing; end March 2015 for CME Inc.'s Base and Interest Rate Swaps services, ICE Clear Credit and JSCC's Interest Rate Swaps service; end April 2015 for LCH.C Ltd's SwapClear service; and June 2015 for ASX Clear and ASX Clear (Futures)

(b) In order of application following use of defaulter's resources

(c) Used concurrently with participant contributions

Sources: Selected CCP Websites; RBA

The event prompted the Korean Financial Services Commission to seek changes to legislation to ensure that CCP capital would be applied in the waterfall prior to the surviving participants' contributions to the default fund (Financial Services Commission 2015).

## Incentives

The composition of a CCP's default waterfall creates incentives for clearing participants and the CCP. These incentives derive from the resources, or skin in the game, contributed by each party to the default waterfall. That is, each party is concerned about the risk that the funds it has contributed to the default waterfall will be used to cover losses arising from a clearing participant default. Each party's skin in

the game can create incentives for prudent risk management by ensuring that each party bears a portion of the cost of a participant default. This can mitigate free-rider problems. It can also reduce the effect of information asymmetries associated with risk-taking and risk management that may arise between a CCP and its participants and between each of the participants of the CCP.<sup>14</sup> The strength of these incentives depend on where a particular

<sup>14</sup> Free-rider problems may arise if participants do not bear the costs or risks associated with their positions at the CCP and consequently build positions with little regard to these costs or risks. Information asymmetries may arise because the CCP does not have complete information about the activities of its clearing participants outside of the CCP (and is therefore unable to fully assess the probability of that participant's default) and because each participant in the CCP does not have complete information about the CCP's risk management framework or the positions of other participants in the CCP.

party's contribution is positioned in the default waterfall, the size of this contribution and the value of resources that precede it.

### Resources contributed by clearing participants

Clearing participants contribute to the default waterfall at several stages, in both a defaulter-pays and a survivor-pays capacity.

The primary defaulter-pays component in the waterfall is clearing participants' margin. Margin imposes an opportunity cost on a clearing participant that is directly linked to the risk on its portfolio, thereby providing the incentive for participants to manage the risk they bring to the CCP. This mitigates the issues associated with the free-rider problem and information asymmetries discussed above. Indeed, the Principles note that in allocating losses arising from a clearing participant default '... a [CCP] should first use assets provided by the defaulted participant, such as margin or other collateral, to provide incentives for participants to manage prudently the risks, particularly credit risk, they pose to [the CCP]' (CPSS-IOSCO 2012a, p 79, also reflected in the Bank's CCP Standards, RBA 2012, p 54). Margin also imposes a cost on a participant from walking away from its obligations, thereby reducing the incentive for strategic default (RBA 2009).

Since a defaulted clearing participant's contributions to the default fund would be used before other prefunded resources in the default fund, such contributions also provide incentives for a clearing participant to manage its own risks and not default strategically. However, depending on the size of the contribution relative to initial margin, these incentives may be less powerful than the defaulter-pays incentives arising from initial margin, since it is less immediately and directly linked to the flow of transactions submitted by that participant to the CCP for clearing. Rather, clearing participants' contributions are typically determined as a share of the CCP's total pooled prefunded resources, which

will also typically be based on other participants' outstanding positions with the CCP.<sup>15</sup>

The survivor-pays nature of prefunded contributions to the default fund creates additional incentives for clearing participants. The risk that participants' contributions will be used to absorb losses arising from the default of another clearing participant encourages each participant to monitor the broader risk management framework of the CCP to reduce the probability of this risk crystallising. For example, a clearing participant will have the incentive to conduct due diligence on a CCP's participation requirements, its ongoing credit assessments of clearing participants, its margin methodology, the structure of its default waterfall and its readiness to manage a default. In this sense, clearing participants will often treat an exposure to a CCP similarly to any other credit exposure; that is, they will undertake a full assessment of the creditworthiness of the CCP as a counterparty, evaluate the probability that a loss is incurred and estimate the potential size of that loss.

The risk that losses will be allocated to the default fund can also encourage participants to proactively support a CCP's default management process to ensure that losses are minimised. In particular, many CCPs that clear OTC derivatives recognise and rely on this incentive, for example when requiring that participants stand ready to provide traders to the CCP (by way of secondment) to support the management of a default. Some CCPs also encourage competitive bidding in any auction of a defaulted clearing participant's positions by drawing first on the default fund contributions of those participants that bid least competitively.

The strength of incentives created by clearing participants' contributions will depend on their

<sup>15</sup> The total value of pooled prefunded resources is generally calibrated to cover the losses faced by a CCP in the event of the default of the participant with the largest exposures or, in the case of CCPs that are systemically important in multiple jurisdictions, the two participants with the largest exposures. Nevertheless, CCPs typically calculate each participant's contribution to the pooled prefunded resources as a pro-rata share based on the risk that participant brings to the CCP – for example, based on each participant's share of total initial margin. This provides some incentive for a participant to manage its positions.

relative size and positioning within the default waterfall. Participants' contributions to a default waterfall that follows the typical sequencing outlined above are less likely to be used to cover losses if defaulter-pays resources and/or the CCP's own capital account for a large proportion of a CCP's default waterfall. All else being equal, such a scenario could result in participants having a limited incentive to take an interest in the risk management of the CCP or to actively support the CCP's default management process.

The allocation of losses to surviving clearing participants at later stages in the default waterfall (e.g. via recovery tools such as assessments and haircutting of participants' variation margin gains) will also provide incentives for clearing participants to support the CCP's default management process and to monitor the CCP's risk management framework. However, the positioning of these resources later in the typical default waterfall, and the relatively low likelihood that these resources would be used, may result in such incentives being somewhat weaker than those arising from prefunded contributions to the default fund.

### Resources contributed by the CCP

The incentives arising from a CCP's contribution to the default waterfall have been widely discussed recently (JP Morgan Chase & Co 2014; LCH.Clearnet Group 2014; CME Group 2015; Cœuré 2015). As with surviving clearing participants, CCPs have an incentive to minimise the risk that their own resources will be used to cover losses from the default of a clearing participant. This exposure encourages the CCP's owners to manage risks prudently, for example by setting appropriate margin requirements and through monitoring of participants. The question then arises as to how large this exposure needs to be to generate the optimal incentive for the CCP.

Ultimately, a CCP's total loss-absorbing capacity must be sufficient to cover the potential losses faced by the CCP during periods of financial market stress. However, the distribution of losses among

the contributing parties can significantly influence incentives. As discussed above, to encourage sound risk management and minimise free-rider problems and the effect of information asymmetries, each party should contribute to the CCP's total loss-absorbing capacity in proportion to the level of risk that they bring to the CCP. However, unlike clearing participants, the CCP does not have proprietary exposures in the markets it clears. Rather, the CCP maintains a balanced book at all times, which becomes unbalanced only in the event of a clearing participant's default.<sup>16</sup>

Nevertheless, the CCP has ultimate control over its risk management framework and faces an incentive for prudent risk management that derives from its contribution to the default waterfall. This is similar to the incentive arising from non-defaulting participants' contributions – that is, the CCP has an incentive to ensure that its risk management framework minimises the potential losses it may face in the event of a clearing participant default. The strength of this incentive is determined by the value of the CCP's resources at risk in the event of a participant default. That is, the CCP's incentives for prudent risk management are likely to be optimised by requiring its skin in the game to be a material portion of its own capital – and this would be true irrespective of the size of the CCP's skin in the game relative to the size of its total default waterfall.

The strength of the incentive created by a CCP's skin in the game also depends on its position in the default waterfall. Positioning the CCP's contribution to the default waterfall directly after the prefunded resources of a defaulted clearing participant would maximise the CCP's incentives to manage risk conservatively, while maintaining the generally accepted defaulter-pays principle. In this situation, the CCP has an incentive to set margin as high as it can in order to preserve its own capital. The CCP will do so within the limits set by the preferences

<sup>16</sup> That is, although a CCP may become a transmission channel for financial market stress – by allocating losses to participants as part of the default waterfall or in recovery – it is not itself an initial trigger for such stress (Heath, Kelly and Manning 2015).

of its clearing participants, who would balance the opportunity cost of posting initial margin (which affects a participant's willingness to trade) against the reduced risk of bearing losses arising from the default of another clearing participant (Carter *et al* forthcoming).

There are also threshold effects associated with appropriately sizing a CCP's skin in the game. For instance, the contributions of a number of the CCPs in Table 1 (above) account for between 1 and 6 per cent of prefunded pooled resources. All other things equal, small changes to a CCP's skin in the game around these low levels are unlikely to result in material changes in the balance of clearing participant and CCP incentives for prudent risk management. Conversely, a very large increase in a CCP's contribution to the default waterfall relative to clearing participant contributions may reduce participants' incentives to take an active interest in the CCP's broader risk management framework.<sup>17</sup>

Factors other than incentives are also relevant for determining the appropriate size of a CCP's contribution to the default waterfall. For example, replenishment of the CCP's capital contribution may be more difficult and costly than replenishment of the same total value of contributions from a dispersed group of clearing participants. If a CCP's skin in the game accounts for a significant proportion of its balance sheet, replenishment of its contribution to the waterfall may require the CCP to raise significant external funds which, all other things equal, may prove difficult in a period of financial market stress.

### The role of governance and transparency

The ordering and relative sizes of contributions by the CCP and by clearing participants to the default waterfall influence the incentives of each party to monitor and manage risks to the CCP. However, the effectiveness of these incentives in delivering a

sound risk management framework also depends on how much control each party has over a CCP's risk management framework (Kroszner 2006).

Ideally, the structure of a CCP's default waterfall should ensure that the party that is best placed to set prudent risk controls has the greatest incentive to do so. Clearing participants are able to respond directly to incentives presented by the margin component of their contributions to the waterfall, by changing their portfolio of trades and the corresponding risk that they bring to a CCP. Accordingly, in the event of a default, the defaulted participant's contributions to the default waterfall should be used first, since it is the ultimate decision-maker regarding its exposures to the CCP. In addition, the CCP's contribution to the default waterfall should be used first to absorb losses that exceed the defaulter's collateral, as the CCP is the ultimate decision-maker regarding its overall risk management framework.

The concept of control over a CCP's risk management framework is also relevant for clearing participants' contributions to the pooled prefunded resources that are included in the default waterfall. However, a clearing participant's ability to act on the incentives created by this component of its contributions may be limited. Specifically, a clearing participant cannot act on incentives related to the CCP's broader risk management framework unless it has a clear understanding of that framework, as well as a voice in the governance of the CCP.

In this regard, details of a CCP's risk management framework, such as its default management and loss allocation procedures, must be transparent, available to all stakeholders and clearly define the extent to which the CCP has discretion over certain actions. This requirement for transparency is reflected in the Principles. In particular, the Principles (and the Reserve Bank's corresponding CCP Standards) set out specific disclosure requirements regarding a CCP's publication of data, operating rules, and key policies and procedures. CCPs are also required to regularly compile and publicly disclose information relevant to the CPSS-IOSCO *Principles for Financial*

<sup>17</sup> A large amount of CCP skin in the game relative to total participant contributions may be optimal where participant monitoring of a CCP's risk management framework is costly. For example, when a CCP has a large number of very small participants.



*Market Infrastructures: Disclosure Framework and Assessment Methodology* (CPSS-IOSCO 2012b), and, from January 2016, meet the CPMI-IOSCO *Public Quantitative Disclosure Standards for Central Counterparties* (CPMI-IOSCO 2015).

In addition, a CCP's governance arrangements should provide all parties potentially exposed to losses associated with the CCP with effective channels to assert appropriate influence over the CCP's risk management framework (Kroszner 2006). This fundamental requirement is also reflected in the Principles (and the Reserve Bank's corresponding CCP Standards), which require a CCP's governance arrangements to 'include appropriate consideration of the interests of participants, participants' customers, relevant authorities and other stakeholders' (CPSS-IOSCO 2012a, p 27). This includes mechanisms for participant representation on a CCP's board, participant and user committees and consultation processes for material changes to a CCP's risk management framework.

## Conclusion

The composition of a CCP's default waterfall creates various incentives for clearing participants and the CCP. These incentives all need to be balanced to ensure appropriate risk management outcomes are delivered. In the face of different operating environments, market structures and types of participants, there are likely to be a range of alternative default waterfall structures where the incentives of a CCP and its participants are effectively aligned. Accordingly, there is no single optimal default waterfall structure or quantitative measure of the resources used within a default waterfall that would apply in all circumstances.

However, for a CCP's default waterfall to encourage effective risk management, it must ensure that those with control over the risk management framework have the incentives to deliver prudent outcomes and that those who are exposed to losses have influence over the CCP's risk management framework. The amount of a CCP's own funds contributed to the

default waterfall should therefore be material to the CCP, regardless of the materiality of this contribution to the total size of the default waterfall. One way to achieve this might be to link the CCP's contribution to a CCP's total regulatory capital, as occurs under EMIR. In the event of a clearing participant default, a material part of the CCP's capital should be used first to absorb any losses in excess of a defaulter's collateral.

In addition, the defaulter-pays and survivor-pays resources contributed by clearing participants to the default waterfall provide participants with an incentive to control their exposures to the CCP and take an interest in the broader risk management framework of the CCP. In order for this incentive to be effective, the CCP's risk management framework must be transparent and clearing participants must have appropriate input into this framework. ✖

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