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Non-default loss allocation at CCPs

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Abstract

In this paper, we answer three questions about the appropriate allocation of non-default losses at central counterparties (CCPs): 1) "Who should assume financial responsibility for a non-default loss?", 2) "What portion of a non-default loss should each party pay?", and 3) "How should CCPs and clearing members address catastrophic non-default losses?". To answer the first question, we argue that financial responsibility should be shared among the parties whose decisions contributed to the loss. Determining whose decisions contributed to a loss requires an understanding of the type of loss involved. To answer the second question, we argue that the CCP and clearing members should establish a loss-sharing formula that takes into account the CCP's ownership structure and the particular needs of the CCP and its clearing members. The third question concerns what we term catastrophic losses – losses so large that those responsible for absorbing them cannot do so. We argue that to address catastrophic losses, the CCP and clearing members should consider not the cause of the loss, but whether the value of continuing the CCP's operations justifies covering it.

1. Introduction

Central counterparties (CCPs) interpose themselves between holders of contracts in cleared markets, standing as the buyer to all sellers and seller to all buyers and guaranteeing each contract's financial performance. CCPs support their guarantee of performance through extensive risk management. Managing the risk of clearing member default is a CCP's core function. CCPs manage default risk by mutualizing it among their clearing members; if a clearing member defaults and its financial resources are insufficient to cover its obligations to the CCP, the CCP and non-defaulting clearing members provide resources to satisfy the remaining loss.[2] CCPs must also manage non-default risks including the potential for business and operational failures, custodial failures, or investment losses. CCPs' policies on whether, and to what extent, they mutualize non-default risks vary widely.

In this paper we seek to answer three questions about the appropriate allocation of losses from non-default risks: 1) "Who should assume financial responsibility for a non-default loss?", 2) "What portion of a non-default loss should each party pay?", and 3) "How should CCPs and clearing members address catastrophic non-default losses?". To answer the first question, we argue that financial responsibility should be shared among the parties whose decisions

[1] The views expressed in the paper are the authors' own and do not reflect the policy of the Federal Reserve Bank of Chicago or the Federal Reserve Board.

[2] This is true up to a point; if the cost of guaranteeing the performance of a defaulter's contracts is so high as to exhaust the resources of the CCP and its members, the CCP may tear up the contracts in the affected area or close down service altogether.

contributed to the loss. Determining whose decisions contributed to a loss requires an understanding of the type of loss involved. To answer the second question, we argue that the CCP and clearing members should establish a loss-sharing formula that takes into account the CCP's ownership structure and the particular needs of the CCP and its clearing members. The third question concerns what we term catastrophic losses – losses so large that those responsible for absorbing them cannot do so. We argue that to address catastrophic losses, the CCP and clearing members should consider not the cause of the loss, but whether the value of continuing the CCP's operations justifies covering it.

2. Background

2.1. Types of non-default losses

There are three main sources of non-default losses: operational or business failures, custodial failures, and investment losses. Business or operational failures could include a cyberattack, a litigation liability, fraud by a CCP employee, or an IT system failure. Both investment and custodial losses relate to the initial margin that clearing members post for their positions. Clearing members can use either cash or securities. When they post cash, the CCP invests the cash according to its investment policies. An investment loss would reduce the value of a clearing member's margin and require the clearing member to provide additional assets. When clearing members post non-cash initial margin, they deposit it with an approved custodian. The failure of a custodian could lead to the loss of or, more likely, a delay in gaining access to a clearing member's non-cash margin.

While the magnitude of a potential non-default loss is difficult to predict, the sums involved could be large enough to put a CCP's survival in doubt; some industry experts argue that non-default losses could pose a greater threat to the solvency of a CCP than a clearing member default (Rundle 2016).

2.2. Current non-default loss policies

2.2.1 Who should assume financial responsibility for a non-default loss?

The Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO), global standard setters for financial market infrastructures, have put forth guidance on how CCPs should address non-default losses. In their *Resilience and recovery of central counterparties (CCPs): Further guidance on the PFMI*, CPMI-IOSCO states that "a CCP should identify the amount of its own resources to be applied towards losses arising from custody and investment risk, to bolster confidence that participants' assets are prudently safeguarded" (p.42). CPMI-IOSCO stipulate that CCPs should set aside the identified resources to cover only custody or investment losses. According to the *Further Guidance,* a CCP should "hold sufficient liquid net assets funded by equity…that it can continue its operations and services as a going concern" after a business loss (p.42-43). A CPMI-IOSCO report on *Recovery of financial market infrastructures* argues that general business losses should be the responsibility of a CCP, while it is reasonable to share custody and investment risks between the CCP and its members (p. 28). The Bank of England has issued a report suggesting that a CCP and its clearing members could share investment losses (Bank of England 2013, p.9).

Currently, CCPs have various policies in place allocating non-default losses. LCH and ICE Clear Europe share investment losses between the CCP and clearing members. They do not allocate operational or business losses to clearing members. Nasdaq Clearing bears the entire cost of all investment and operational losses (Rundle 2016). Eurex Clearing covers all operational losses, but shares investment losses with clearing members if they posted cash in a currency for which Eurex does not hold a central bank account (Eurex 2015; Eurex 2017, p. 83). LCH and ICE Clear Europe explicitly reject liability for any portion of custody losses except, for ICE, "to the extent such Custodial Losses result from the gross negligence or wilful *(sic)* misconduct of the Clearing House" (LCH 2017, p. 158; ICE Clear Europe 2017, p. 140).

2.2.2. What share should each party pay?

LCH and ICE Clear Europe each provide a fixed amount of capital to absorb investment losses and then allocate any remaining loss to clearing members (Rundle 2016). They distribute losses among clearing members pro rata based on total initial margin posted, which includes both cash and securities (Puleston Jones 2015). Eurex shares investment losses pro rata with the clearing members who posted margin in the currency that suffered investment losses. There is a cap of €50 million on Eurex's liability (Eurex 2017, p. 83).

Some clearing members argue that CCPs should bear all business and operational losses. If investment losses are allocated to clearing members, they argue that allocations of investment losses to clearing members should be proportional to cash posted rather than total initial margin and that there should be a cap on clearing member liability. Clearing members have suggested that if a CCP does not cover all investment losses, clients as well as clearing members should share in the loss (Puleston Jones 2015).

2.2.3. How should CCPs and clearing members address catastrophic non-default losses?

To the best of our knowledge, this question has not yet been addressed by regulators, standards setters, or CCPs.

3. Who should assume financial responsibility for a non-default loss?

Clearing members and the CCP should assume financial responsibility for non-default losses in accordance with each party's contribution to the loss. Where both the CCP and a clearing member made choices that contributed to a non-default loss, they should share it. Where only the CCP made decisions that contributed to the loss, the CCP should bear all of it. Allocating losses in this manner is fair to the CCP and its clearing members and provides all parties with an incentive to minimize the risk of non-default loss, to the extent that their decisions can affect risk exposures. To determine how to allocate losses in accordance with each party's contribution to the loss, we consider each type of non-default loss in turn.

3.1. Business or operational failure

A CCP should cover all of a loss resulting from a business or operational failure. A CCP's owners choose and supervise the managers who run the CCP. The managers make decisions that either lead to or prevent business and operational failures. Therefore, the CCP's owners are ultimately responsible for such failures and should bear the cost.

At a demutualized CCP, shareholders are responsible for running the CCP well and avoiding business or operational failures. When the CCP is run effectively, the shareholders earn a return on the capital that they have invested; when it is run poorly, they should bear the loss. Requiring shareholders to bear any losses resulting from poor management also reinforces their incentives to reduce the risk of a loss by ensuring proper management of the CCP.

A mutualized CCP is owned by its members; the member-owners keep any profits and must cover any losses of the CCP. Requiring a mutualized CCP to bear losses resulting from a business or operational failure requires all clearing members to bear the loss. Since the members as a whole have a responsibility to ensure that the CCP is run well, assigning losses to the CCP, and so to all clearing members, preserves their incentives to monitor the CCP's management. Clearing members should share losses in a manner that reflects each clearing member's interest in the CCP: either in proportion to each clearing member's ownership stake or in proportion to their initial margin requirement.

One possible exception to the proposed allocation of business losses would be a situation where a CCP suffered a cyberattack or other operational failure facilitated by a connection between the CCP and a clearing member. In such a case, the loss should be shared between the responsible clearing member and the CCP.

3.2. Investment losses

To determine the proper allocation of investment losses, we must first understand CCPs' investment policies. To support their open positions at a CCP, clearing members post initial margin, which tends to be either cash or securities. If clearing members post cash, then the CCP invests it according to its investment policies, generally set by the CCP's risk committee. The risk committee typically consists of clearing member representatives, CCP representatives, and independent experts. At some CCPs, once clearing members post cash, they have no further choice about how it is invested; the CCP is free to invest the cash however it chooses as long as it complies with the guidelines of its investment policy. At other CCPs, the CCP provides several investment options; a clearing member chooses first to put up cash and then in which investment options it wishes its cash invested.

Investment losses should be shared between the CCP and the clearing members with assets in the affected investments. Through its role in setting investment policies and in its determinations about where to invest cash or what investments to make available to clearing members, the CCP bears some responsibility for an investment loss. Where the CCP choses how to invest the cash, it bears greater responsibility for any loss. Therefore, the percentage of the loss that the CCP bears should be larger where it invests clearing members' cash than where clearing members choose the investment option.

Some CCPs retain a portion of investment returns rather than passing on all gains to clearing members. As the proportion of the gains that a CCP retains increases, so too should its share of any losses. If a CCP does not pass on any investment gains to clearing members, the CCP should cover all investment losses; if it accepts the return, it must also bear the risk.

Which clearing members should share in the loss depends upon the CCP's investment policy. In all cases, clearing members who posted securities are not responsible for the investment losses of those who posted cash and so should not bear any of the loss. At a CCP where the policy is to take cash and invest it with no further clearing member input, the CCP and all clearing members that posted cash should share the loss since all who posted cash are equally likely to have had their money in the losing investment. The loss should be shared among clearing members in proportion to the cash that each posted. At a CCP where the clearing members chose their investment option, the loss should be shared between the CCP and all clearing members that invested in the losing option, with losses shared among clearing members in proportion to the amount of cash that each member invested. This gives clearing members an incentive to choose less risky investment options.[3]

3.3. Failure or insolvency of a custodian

Clearing members who post securities as margin must place them with a custodian approved by the CCP. The failure of a custodian could lead to the loss of the clearing member's securities, but would more likely simply lead to a delay in accessing them. The cost from the delay or the cost of replacing the securities should mainly be borne by clearing members, though CCPs should commit a fixed amount of capital to be used along with clearing member funds.

Clearing members who own or possess securities must place them with a custodian. Whether or not they use the securities as margin at a CCP, clearing members with securities are exposed to custodial risk. CCPs exist to reduce counterparty risk, not to insure clearing members

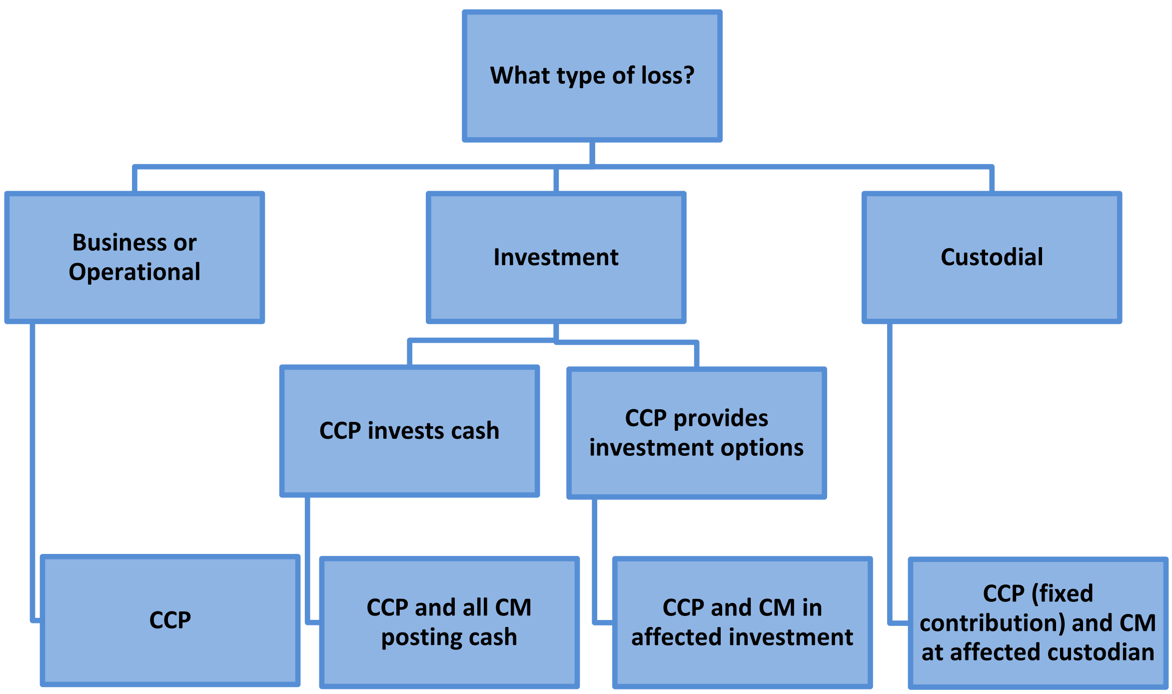
[3] European regulations require that CCPs mitigate custodial risk by investing the vast majority of the cash margin they hold. This does not change the appropriate allocation of investment losses since clearing members can still choose whether to post cash or securities and CCPs are still largely free to determine their investment policies. See Rundle (2016).

against the custodial risk that they incur in owning securities. Thus, clearing members should bear the vast majority of custodial risk for the securities they post as margin.

However, the use of a CCP may change the level of custodial risk that clearing members face since CCPs provide clearing members with a list of acceptable custodians, limiting clearing members' options. In order to ensure that CCPs seek out safe custodians, the CCP should have some capital at risk in a custodial loss. A CCP contribution also recognizes that CCPs do change the custodial risk faced by clearing members, even if most of the risk would remain in the absence of the CCP. Since custodial risk is mainly a result of owning securities, not pledging them as margin at the CCP, the CCP's contribution should be a fixed sum large enough to incentivize the CCP to make appropriate custodial decisions but not so large as to absorb most of a potential loss.

The fixed CCP contribution should increase as the custodial options the CCP offers to its clearing members decreases. An exception to this rule would be in markets where there were only one or very few banks willing to act as custodians; where the lack of options was the result of market conditions and not the CCP's decisions, clearing members should continue to bear the vast majority of any custodial loss.

Figure 1. Who should assume financial responsibility for a non-default loss?



4. What proportion of a non-default loss should each party pay?

In this paper, we recommend that custodial and investment losses be shared among the CCP and affected clearing members. The exact loss-sharing formula that a CCP adopts should take into account the CCP's ownership structure and the particular needs of the CCP and its clearing members.

4.1 Loss-sharing formulas at demutualized CCPs

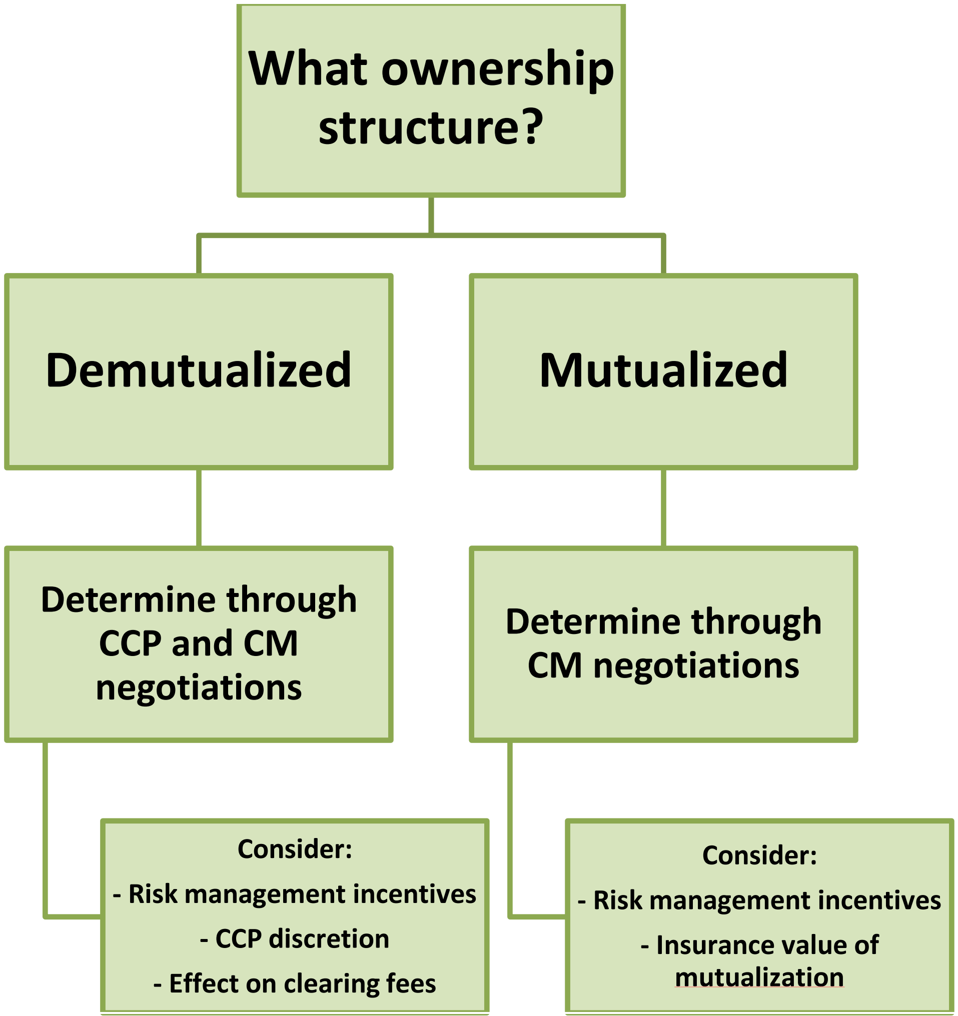
At a demutualized CCP, the CCP and clearing members should negotiate a loss-sharing formula, taking into account several considerations. With investment losses, each party should bear a large enough proportion of a potential loss that they have an incentive to monitor and reduce investment risk. A CCP's fixed contribution to a custodial loss should be large enough to ensure that the CCP has an incentive to seek out a range of safe custodial options. The proportion of the investment loss each party bears and the size of the CCP's fixed contribution to custodial losses should also take into account the discretion each party has. For example, if a CCP in a particular market played a significant role in determining the custodial options available to its clearing members, then it should contribute more to a custodial loss than a CCP that had limited choice over the available options.

A CCP and its clearing members should consider the cost of the CCP's commitment to cover a larger portion of a potential loss. A commitment to cover a greater portion of a loss may require the CCP to increase clearing fees. Clearing members may prefer lower fees and a smaller financial commitment from the CCP, even if the previous considerations listed suggest that the CCP should contribute more to a loss.

4.2 Loss-sharing formulas at mutualized CCPs

At a mutualized CCP, clearing members should negotiate to determine the loss-sharing formula. Since a mutualized CCP is owned by its clearing members, the CCP's financial responsibility for the loss is mutualized among clearing members. The CCP should cover a large enough portion of a loss to provide all clearing members with an incentive to monitor the CCP's management and ensure that the CCP maintains responsible custody and investment policies. Independent of the need to maintain an incentive for clearing members to monitor management or CCP policies, a CCP's clearing members may decide that they value the protection provided by mutualizing custody or investment risk. If so, they could raise the proportion of an investment loss covered by the CCP or the CCP's fixed custodial loss contribution.

Figure 2. What proportion of a non-default loss should each party pay?



5. How should CCPs and clearing members address catastrophic non-default losses?

The discussion above holds for losses small enough that the responsible parties can afford to cover them. What happens after a loss so large that those responsible for absorbing it cannot do so? In this case, the key question is no longer who is responsible, since, by definition, the responsible party cannot pay. Rather, the question is whether the CCP or clearing members believe that the value of continuing the CCP's operations justifies covering the loss. Determining whether and how to continue CCP operations after a catastrophic non-default loss depends upon the CCP's ownership structure and which party failed to pay.

5.1 Allocating catastrophic non-default losses at mutualized CCPs

At a mutualized CCP, if the CCP cannot pay its share of a non-default loss, the clearing members should decide whether or not to recapitalize the CCP. Those clearing members that believe the value of their and their customers' open positions to be greater than the cost of covering the catastrophic loss will likely be willing to recapitalize. If enough clearing members choose to do so, CCP operations can continue, otherwise, the CCP must wind down operations.

If a clearing member fails to pay its share of a non-default loss, it should be declared in default. After its positions are closed and its customer positions ported, any remaining initial margin and default fund contribution can be used to cover all or a portion of their shortfall. If the defaulter's resources are not enough, then the remaining clearing members must determine whether to recapitalize the CCP or wind down operations.

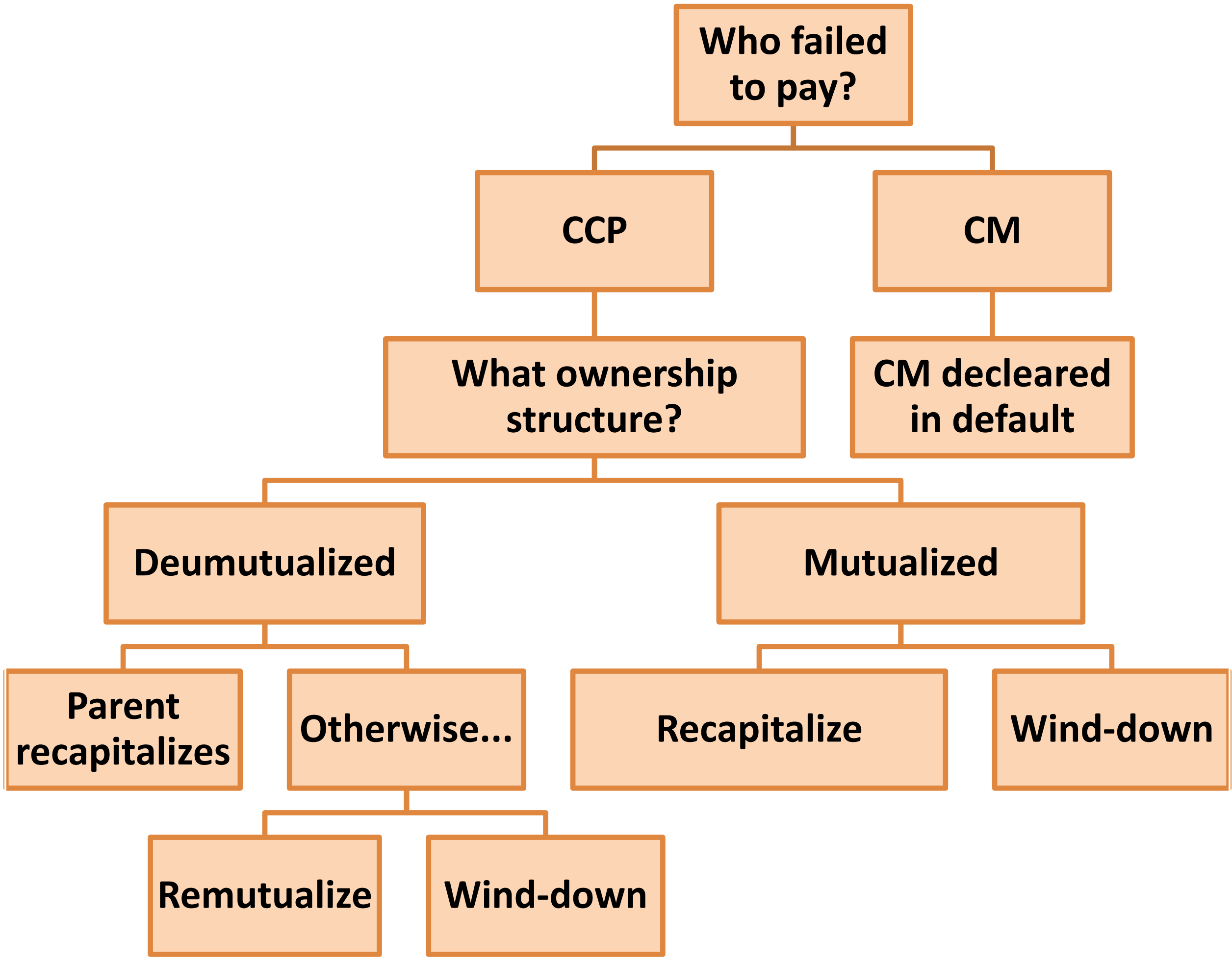
The proposed re-mutualization plan does have a flaw that in some cases may bias a CCP towards wind-down: as more clearing members decide not to participate in a remutualization, the number of clearing members that would have to bear the cost of the non-default loss and recapitalization would decrease, raising the cost of participating in remutualization. This could lead to a vicious cycle in which some clearing members decide not to participate, raising the value of the CCP required to justify participation, leading more clearing members to decide not to participate, further raising the value of the CCP required to justify participation.

5.2. Allocating catastrophic non-default losses at demutualized CCPs

If the shareholders of a demutualized CCP cannot cover their share of the loss, then their equity in the CCP should be wiped out. Many demutualized CCPs are part of larger financial organizations. Once the CCP's shareholder equity is wiped out, the CCP's parent company should have the option to recapitalize the CCP. If the parent company declines to do so, clearing members should have the option to remutualize the CCP. If enough clearing members participate, the CCP would be able to continue operation, now as a mutualized, rather than a demutualized CCP. If few or no clearing members chose to participate in a remutualization, then the CCP would need to be wound down.

If a clearing member at a demutualized CCP cannot cover its share of a non-default loss, it should be declared in default, with its margin and default fund contribution used to manage the default and cover the non-default loss. If this is not enough, then the shareholders and clearing members must determine how to apportion the remaining loss. If a fair apportioning of the loss wipes out shareholder equity, then the parent company or remaining clearing members must recapitalize or wind down the CCP as described above.

Figure 3. How should CCPs and clearing members address catastrophic non-default losses?



5.3. Should CCPs mutualize catastrophic non-default losses?

In the previous sections, we recommend that a clearing member unable to cover its portion of a catastrophic non-default loss be declared in default, with its positions closed, customers ported, and any default-related losses covered using the CCP's standard default management procedures. This strategy carries with it some risks, and CCPs may prefer to mutualize responsibility for a catastrophic non-default loss among all clearing members rather than force a clearing member into default. Whether a CCP chooses to do so will depend upon its tolerance for the risk of the default management process and its confidence in its ability to reestablish a matched book after the default of the clearing member responsible for a non-default loss.

Following a catastrophic non-default loss, the default management process may be particularly risky; it is not certain that clearing members will be willing to accept new clients or that markets will be sufficiently liquid to absorb the defaulter's house positions. If the CCP is able to liquidate house positions and transfer clients, it may be so expensive as to require mutualized default resources. If the CCP is unable to liquidate positions and transfer clients, it will be left with an unmatched book that continues to accrue losses, potentially imperiling the survival of the CCP. Some CCPs may find it safer to mutualize catastrophic losses and avoid these risks associated with managing a clearing member default.

In spite of the risks, a CCP and its clearing members may determine that non-mutualized resources will likely be sufficient to cover both the non-default loss and the cost of transferring a defaulter's clients and liquidating its house positions. The default waterfall used to cover default losses has several layers before it reaches the resources of non-defaulting clearing members. Given this waterfall structure, clearing members and CCPs may prefer to allow a clearing member to default, which may, on some occasions, result in a loss mutualization, rather than to guarantee loss mutualization up front.

Further considerations

6.1. Quasi-national CCPs

Thus far, we have discussed two CCP ownership structures: demutualized and mutualized. A third ownership structure is the quasi-national CCP. Quasi-national CCPs are wholly or partially owned by the government of the country in which they operate. In most cases, the analysis for a demutualized CCP would apply, with the government acting as just another shareholder. The major exception is in the case of a loss so large that all CCP shareholders are wiped out. While shareholders cannot lose more than their investment in the CCP, the government could continue to support the CCP if it perceived the systemic value of the CCP's continued operation to be greater than the expense of recapitalization. The potential for government backing means that in the case of a catastrophic loss, remutualization, as outlined above, is one of two options for continuing the operations of a quasi-national CCP. The other option would be full nationalization, if the CCP had any private shareholders, and then continued government support as necessary to keep the CCP operating. While government support may allow an otherwise unviable CCP to survive, it also creates moral hazard; clearing members and non-governmental shareholders may take riskier actions and be more reluctant to help recapitalize the CCP if they know that the government will provide aid in a crisis.

6.2. Allocating non-default losses to clients

We have advocated that a CCP and its clearing members share investment and custodial losses. Many of the positions a clearing member brings to a CCP are on behalf of its clients. In some situations, it may be reasonable for a clearing member to pass on a share of its custodial or investment losses to its clients.

Just as CCPs do not create the custodial risk that clearing members face, clearing members do not create the custodial risk that customers who own securities face; anyone who owns securities is exposed to custodial risk. Therefore, clearing members could pass on some of their share of a custodial loss to their customers that deposited securities as initial margin. However, clearing members should also bear a significant portion of any custodial loss since, by determining which custodian their customers must use, they change a client's custodial risk; rather than exposure to a custodian of the client's choosing, clients now face exposure to the custodian selected by the clearing member.

When a client deposits cash with its clearing member, the two should negotiate an agreement that stipulates whether and how the cash will be invested and what return the client will receive. Discussions between clearing members and clients about the investment of client cash should also address the division of potential investment losses. While the division should be left to clearing members and their clients to determine, negotiations should take into account two basic principles: If clients know that their cash is invested and are earning a market return on it, allocating some investment losses back to clients is reasonable. Where clients have limited or no discretion as to how or where the cash is held or invested and earn a limited return, clearing members should cover most or all of any investment (or deposit) loss.

6.3. Strategies to mitigate the risk of non-default loss

While the bulk of this paper has focused on how to distribute non-default losses among the owners and members of a CCP, it is also important to consider ways to reduce the risk and size of non-default losses. Several strategies exist for doing so. Many business and operational risks can be insured against. Requiring CCPs to bear part of the cost of non-default losses should encourage them to thoroughly examine the costs and benefits of such insurance where available.

Allowing CCPs to maintain deposit and custody accounts at central banks could reduce the risk of investment loss and custodial failure. Where CCPs are permitted to have deposit accounts at central banks, they can deposit initial margin cash there instead of investing it, eliminating investment risk. As many of the banks providing custodial services to CCPs are also major clearing members, central bank deposit accounts would also help CCPs avoid wrong-way exposure to clearing members. Where central banks permit CCPs to maintain interest-bearing deposit accounts several further benefits are likely. If clearing members react to interest-bearing central bank accounts by posting cash instead of securities, custodial risk would decrease since a smaller proportion of total margin would be held at private sector custodians. Posting cash to be held at central banks instead of securities would also increase the liquidity resources available to a CCP, its clearing members, and market participants. In addition to accepting cash deposits, some central banks allow account CCP account holders to deposit sovereign debt securities. Opening up this service to CCPs would reduce custody risk.[4]

6. Conclusion

In this paper we answered three questions about the appropriate allocation of non-default losses. We answered the first question, "Who should assume financial responsibility for a non-default loss?", by looking to the type of non-default loss involved. We argued that custodial and investment losses should be shared between the CCP and its clearing members, while business and operational losses should be the sole responsibility of the CCP. The second question we addressed was "What portion of a non-default loss should each party pay?". We argued that the CCP and clearing members should determine the appropriate loss-sharing formula, taking into consideration the CCP's ownership structure and the particular needs of the CCP and its clearing members. To answer the final question, "How should CCPs and clearing members address catastrophic non-default losses?", we argued that if the CCP or its clearing members determined that the value of continuing operations justified the cost, then they should provide the necessary funds, regardless of who was responsible for the non-default loss.

Managing the risk of a clearing member default is the core function of a CCP. However, CCPs face many other risks including the potential for business and operational failures, custodial failures, or investment losses. While all CCPs mutualize default risk, policies on non-default risks vary widely. This paper has proposed a framework for addressing the allocation of non-default losses which may provide a way to improve the safety and soundness of CCPs and the broader financial system.

[4] The availability of central bank deposit accounts and custody services would eliminate many of the non-default exposures that CCPs and clearing members face. However most major CCPs clear products in multiple currencies and so direct access to central banks' accounts and services is only a partial solution to a multicurrency challenge that will eventually need to be addressed.

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