

Incentives Behind Clearinghouse Default Waterfalls

SUMMARY REPORT

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OVERVIEW

We study the incentives provided by the conventional clearinghouse default loss allocation mechanism via a theoretical model. The equilibrium solution to our model provides an analytical characterization of important layers of a clearinghouse's loss-absorbing capital, systemic risk, and economic surplus from centrally cleared trading. Our analysis relates incentives provided by the currently used loss allocation mechanism. Our model also provides a framework with which policies, such as the imposition of minimum clearinghouse equity requirements, can be evaluated.

BACKGROUND

Financial institutions mutualize counterparty risk by becoming clearing members of a clearinghouse. As the effective central counterparty (CCP) to all members, the clearing-house's arrangement of various layers of loss-absorbing capital has significant implications for the allocation and management of counterparty risk. The losses originated from defaults of clearing members are allocated among the surviving members according to a "default waterfall".

The first line of defense against losses is the initial margin posted by each member to the clearinghouse, capital used only to absorb losses generated by the defaulting member's portfolio.



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The role and choice of initial margins within central clearing have been extensively investigated in literature. In this paper, we analyze a clearinghouse's incentives behind the determination of the default fund requirement and its equity commitment, resources further down the default waterfall. Default funds are additional contributions, beyond initial margins, made by clearing members and used to absorb losses when their posted margins are insufficient. Different from the initial margin, however, the default fund can be used to absorb losses originating from another member's default, and hence is a bona fide resource of loss-mutualization. The equity commitment of the clearinghouse, also referred to as the clearinghouse's "skin in the game", is a layer of loss-absorbing capital utilized when a defaulting member's default fund contribution is exhausted but before other members' default fund contributions are deployed. The default loss borne by the clearinghouse is typically limited to the amount of equity that it commits. Established to align the interests of the clearinghouse with those of their members, the appropriate level and rules behind a clearinghouse's skin in the game is still an active source of regulatory debate. In particular, skin in the game was one of the major

topics discussed during the Global Markets Advisory Committee Meeting held on May 14, 2015 by the U.S. Commodity Futures Trading Commission (CFTC). Clearing members have generally argued for more contributions from clearinghouses to align interests with those of their members. While major clearinghouses generally agree on the proposed incentive effects, they have argued against their skins in the game being a major source of loss absorption.

METHOD

We assume that the typical default waterfall structure is in place, and construct a model where agents make decisions based on it. In our two-period model economy, there is a continuum of potential clearing members and a profit-maximizing clearinghouse. Each member can be of safe or risky type, and this is private information. Large default fund requirements increase the funding costs borne by members and decrease the amount of (counterparty) risk they can offload to the clearing network; on the other hand, they increase protection from other members' defaults and reduce the clearinghouse's exposure to default losses. Large equity commitments increase members' expected profits by providing a further layer of protection, attracting more members to participate and increasing the clearinghouse's revenue; however, they also increase the clearinghouse's potential for losses.

We fully characterize and provide tractable expressions for the prevailing equilibrium default fund and equity levels. These are related to the amount of risk-sharing, default probabilities, clearing revenue, and funding cost. The prevailing equilibrium can be separating (only risky members participate) or pooling (both types participate). Further, the equilibrium equity commitment is positive only when a clearinghouse wants to attract both types of members to participate, highlighting the incentives behind a clearinghouse's choice of equity commitment.

We measure systemic risk generated by the clearing network with the expected funding shortfall that can arise when all pre-funded resources are exhausted, and perform a comparative statics analysis. Our model readily provides a framework for assessing the impact of minimum equity requirements, a regulatory measure which can be used to mitigate systemic risk.

MAIN FINDINGS

We summarize the main findings in the following:

- A higher funding cost generally decreases the equilibrium default fund, and induces a decrease in the equilibrium equity commitment, as the clearinghouse's exposure to default losses increases.
- Higher risk-sharing increases both the default fund and equity commitment, as safe members demand more guarantees from risky members and the clearinghouse to participate.
- Higher default rates increase the overall riskiness of the market, and thus the clearinghouse's choice of default fund and equity.
- The clearinghouse's optimal mix of default funds and equity resources can incentivize risky members to lower the risk that they impose onto others.
- Systemic risk decreases with risk-sharing but increases with members' revenues.
- A minimum equity requirement policy can increase default fund contributions, which mitigates systemic risk but decreases economic surplus because of the increased funding costs.

POLICY RELEVANCE

Our analysis informs policy making along three important dimensions (I) the impact of minimum

equity requirements, (II) how the economics of risk-sharing impact systemic risk and (III) the importance of relating default resource levels to varying funding costs.

First, minimum equity requirements can induce increases in the default fund. We find that the equilibrium effect of a minimum equity requirement is to increase equilibrium default funds, which reinforces systemic risk mitigation. However, this also creates additional funding costs to the model economy. Our model thus provides guidance to a welfare-maximizing regulator who needs to take into account the equilibrium effects of such a requirement, balancing the additional funding costs with the reinforced systemic risk mitigation.

Second, risk-sharing can mitigate systemic risk but reduces clearing participation. We show that the level of risk-sharing, a measure of member heterogeneity, is central to the determination of default resource equilibria and the associated welfare and systemic risk. This is pertinent to the discussion on how clearinghouses should screen for potential members, and whether it is beneficial to pool the risks of members with various credit qualities. In equilibrium, systemic risk decreases with member heterogeneity, and

pooling members with different risk profiles may be beneficial in terms of mitigating systemic risk. However, since the mitigation stems from increased default resources, this reduces the profitability of clearing and may increase funding costs, which may in turn reduce clearing participation.

Third, low funding costs create the illusion that the clearing network is safe. Default funds generally decrease with funding cost. The current low interest rate environment indicates that funding costs are generally low, which implies that large amounts of capital can be tied up in the clearing network. This may reduce productive capital investments, and thus regulatory policies limiting the increase in default funds when a decrease in funding costs may be socially desirable. At the same time, the large stock of default resources may be taken as evidence that systemic risk stemming from the clearing network is low. However, when market stress is preceded by a period of rising funding costs, the clearinghouse has the incentive to reduce default fund requirements. It does so to increase profit before the stress event, reducing the resilience of the clearinghouse. Policies should thus take into account the sensitivity of the stock of default resources to variations in interest rates.

The complete paper (Capponi, A., Allen Cheng, W., Sethuraman, J. “Incentives Behind Clearinghouse Default Waterfalls”, 2017) can be found on the GRI website at [Global Risk Institute Website](#).



About the Author

Agostino Capponi is an assistant professor in the IEOR Department at Columbia University, where he is also a member of the Institute for Data Science and Engineering. His research is in the area of networks, with a special focus on systemic risk, contagion, and control. The outcome of his work on financial networks contributes to a better understanding of risk management practices, and to assess the impact of regulatory policies aimed at controlling financial markets.