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Central Counterparty Risk

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A clearing member of a Central Counterparty (CCP) is exposed to losses on their default fund and initial margin contributions. Such losses can be incurred whenever the CCP has insufficient funds to unwind the portfolio of a defaulting clearing member. This does not necessarily require the default of the CCP itself. In this note we aim to quantify the risk a financial institution has when facing a CCP.

We show that a clearing member's CCP risk is given by a sum of exposures to each of the other clearing members. This arises because of the implicit default insurance that each member has provided in the form of mutualised, loss sharing collateral. We calculate the exposures by explicitly modeling the capital structure of a CCP as well as the loss distributions of the individual member portfolios.

An important consideration in designing the model is the limited transparency with respect to the portfolio composition and collateral levels of individual clearing members. To overcome this we leverage the fact that, for a typical CCP, margin levels are risk-based. In particular, we parameterise the portfolio loss tail as a Pareto distribution and we calibrate this to the CCP defined probability of losses exceeding the posted initial margin levels.

A key aspect of the model is that we explicitly take into account wrong-way risk, i.e. the fact that member defaults are more likely to occur in stressed market conditions, as well as potential contagion between a member's default and the losses on his portfolio.

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