Clearinghouse (CCP) Default Waterfalls Explained

by Practical Law Finance

Maintained • USA (National/Federal)

Related Content

A Practice Note examining derivatives clearinghouse (CCP) default waterfalls and a Chicago Fed report that provides market guidance on structuring CCP default waterfalls and makes recommendations based on historical CCP default statistics.

Derivatives regulation under the Dodd-Frank Act in the US and European Market Infrastructure Regulation (EMIR) in the EU have forced many common derivatives such as **interest rate swaps** (IRS) to be cleared by derivatives clearinghouses, often referred to as **central counterparties** (CCPs). As a result of this global shift from a **bilateral** to a cleared **over-the-counter (OTC) derivatives** market, CCPs now play a more prominent role in global financial markets and have therefore become a potential source of systemic risk.

A 2017 report issued by the Federal Reserve Bank of Chicago (Chicago Fed report or the report) spotlights this area of increased importance in the post-crisis era, providing market guidance on structuring CCP default waterfalls and recommendations based on historical default statistics of members of derivatives clearinghouses, known as **clearing members**.

For information about the mechanics of CCP swaps and derivatives transactions, see Practice Note, Mechanics of Derivatives Clearing.

Overview of CCP Default Waterfalls

CCPs, which are often described as playing a "quasi-infrastructural" role in global financial markets, guarantee the performance of financial contracts between two parties (see Practice Note, Mechanics of Derivatives Clearing). CCPs provide protection for:

- Counterparties to a defaulting party's cleared contracts.
- The broader global (or if fragmented, jurisdictional) financial markets.
- The CCP's clearing members.

While a clearinghouse can easily cover a default under any single cleared contract, what happens when a key member of the clearinghouse – such as a clearing member – becomes insolvent or bankrupt and therefore defaults under thousands of CCP-cleared contracts at once?

The key component of a CCP risk-management strategy designed to address these crises is known as the CCP default waterfall. The default waterfall's purpose is to provide and prioritize financial resources a CCP can draw from to recover unsatisfied financial obligations of a defaulted clearing member.

CCP default waterfall structures must balance:

- The burden on the contributing parties, which itself must be balanced.
- The purpose for which CCP waterfalls exist, which is to minimize impact of a clearing member (or other major) default on the broader financial markets.

Default Waterfall Mechanics

All CCPs have a default waterfall that provides financial resources for managing a clearing member default. The Chicago Fed report recommends that default waterfalls generally follow the following two-tiered sequence to cover unsatisfied financial obligations:

- On the top tier are the **margin** and default-fund contributions of the defaulting clearing members.
- The remainder of the waterfall consists of contributions from the CCP and its other clearing members. The CCP contributions are known as skin-in-the game.

CCP default waterfalls include both:

- Prefunded resources.
- Unfunded obligations.

During a default, the CCP has two obligations:

- First, the CCP is responsible for the financial obligations of the defaulting member under its cleared contracts with the CCP.
- Second, if another clearing member cannot be found to take the defaulting member's client contracts cleared at that CCP, the CCP must liquidate the defaulted clearing member's contracts to restore its ledger to matched-book status.

Optimizing Default Waterfall Models

The Chicago Fed report notes that it is important for both the CCP and clearing members to fund the CCP default waterfall. Therefore, the ideal CCP default waterfall is not funded exclusively by either the CCP or its clearing members.

However, knowing that both sources of funding should be included in the waterfall is not enough; the arrangement and size of the various **tranches** also matter. The report therefore recommends certain structural features that should be common to all CCP waterfalls.

The report breaks down the tranche structure into four levels of funding:

- Defaulter's initial margin and guarantee fund contribution (see First Level: Defaulter's Initial Margin and Guarantee Fund Contribution).
- CCP-funded junior tranche (see Second Level: CCP-Funded Junior Tranche).
- Clearing member guarantee fund contributions and unfunded assessments (see Third Level: Clearing Member Guarantee Fund Contributions and Unfunded Assessments).
- CCP-funded senior tranche or public-sector-funded senior tranche (see Fourth Level: CCP-Funded Senior Tranche or Public-Sector-Funded Senior Tranche).

Waterfall Tranches

Table 1: Default Waterfall Structures

CCPs ownership falls into three categories and there is some commonality between all three forms of CCPs (for a description of these three CCP structures, see Quasi-National CCP, Demutualized CCP, and Mutualized CCP).

In all cases, the CCP is responsible for funding the junior tranche. Additionally, in all three cases, the clearing members of CCPs must make guarantee fund contributions. The report, however, funds the senior tranche differently depending on the CCP structure. Under the quasi-national structure, the senior tranche is publicly funded. However, in both a demutualized and mutualized CCP, the CCP itself is responsible for maintaining the senior tranche as well as the junior tranche.

TABLE 1

Default waterfalls for three CCP structures

Quasi-national CCP	Demutualized CCP	Mutualized CCP
Defaulter's initial margin	Defaulter's initial margin	Defaulter's initial margin
Defaulter's guarantee fund contribution	Defaulter's guarantee fund contribution	Defaulter's guarantee fund contribution
CCP-funded junior tranche	CCP-funded junior tranche	CCP-funded junior tranche
Clearing member guarantee fund contributions	Clearing member guarantee fund contributions	Clearing member guarantee fund contributions
Unfunded clearing member assessments	Unfunded clearing member assessments	Unfunded clearing member assessments
Public-sector-funded senior tranche	CCP-funded senior tranche	CCP-funded senior tranche

First Level: Defaulter's Initial Margin and Guarantee Fund Contribution

Upon a default by a non-clearing member the defaulting party's posted margin is liquidated. Posted **variation margin** (VM) should cover much of the defaulting party's **exposure**. Posted **initial margin** (IM) may cover all or a large part of any remaining losses. A typical non-clearing-member counterparty default would rarely exceed these resources. The default of a clearing member, however, may exhaust posted IM and the defaulting clearing member's prefunded guarantee fund contribution is then used to pay any losses.

Second Level: CCP-Funded Junior Tranche

If the defaulting party's IM and guarantee fund contribution do not satisfy the defaulted obligations, the next level of protection recommended in the report is the CCP's junior tranche. The Chicago Fed report notes that there are policy benefits to having material CCP skin-in-the-game at the top of the default waterfall. The CCP-funded junior tranche is designed to accomplish two important objectives, serving as both:

- **Auction inducement.** Because a CCP needs to return to matched-book status following a default, the CCP first liquidates the open positions of the defaulting clearing member. A junior tranche composed of CCP capital provides an incentive for clearing members and other interested market participants to participate in the CCP's auction of the defaulting party's positions and to place lower bids than they would otherwise. A net auction loss on the defaulter's positions will not harm non-defaulting clearing members until the defaulter's resources and the CCP junior tranche are depleted.
- **Nuisance-avoidance deductible.** Placing the CCP-funded junior tranche before the clearing member guarantee fund contributions helps clearing members avoid the difficult task of replenishing their guarantee fund contributions after the default of a modest-sized clearing member. Typically, clearing members must obtain corporate funding to replenish contributions to a CCP default fund.

Third Level: Clearing Member Guarantee Fund Contributions and Unfunded Assessments

Though it has never happened (see Table 2: Clearing Member Defaults), if the defaulter's resources and the CCP junior tranche were insufficient to cover a clearing member (or other) default, the next level of loss absorption would come from the contributions of the nondefaulting clearing members. Clearing member contributions are a condition of CCP membership. In a default these funds provide an additional buffer against a major default. This tranche is referred to as the clearing member guarantee fund.

Clearing member agreements with the CCP provide another layer of protection. If a default were to create losses that were not coverable by the clearing member guarantee fund, the CCP would have the right to make certain financial assessments against the nondefaulting clearing members to satisfy any further deficiency.

Fourth Level: CCP-Funded Senior Tranche or Public-Sector-Funded Senior Tranche

According to the report, the optimal CCP model also includes a CCP-funded or public-sector-funded senior tranche to replenish depleted junior tranches following a default. Replenishment would occur immediately, which would quickly restore public confidence in the aftermath of a clearing member default.

Magnitude of CCP-Funded Junior Tranche

The report also considers the appropriate magnitude of the CCP's skin-in-the-game. Position papers written by industry participants have advocated minimizing the CCP's skin-in-the-game, proposing that the CCP contribution could be:

- Based on a fixed percentage of the total default waterfall resources.
- Equal to the first-, second-, or third-largest clearing member's contribution.

The report notes, however, that there is scant empirical support for these proposals.

The report recommends that the amount of a CCP's contribution to its default waterfall be agreed to by the CCP and its prudential regulator. Determining the proper size of the CCP's contribution in the default structure is important because, as noted, if the junior tranche is too large it could adversely affect the incentive of clearing members to onboard the clients of a defaulting member. However, if the tranche is small enough that nondefaulting clearing members believe the loss would exhaust the junior tranche and begin to deplete the clearing member guarantee fund, they then have financial incentive to onboard the clients of a defaulting member.

The report notes crucial questions that industry observers are likely to ask:

- Is a CCP's skin-in-the-game prefunded and, if so, where is it held?
- If it is not prefunded, then what measures would the CCP or its parent company need to undertake under possibly adverse circumstances in order to fund its skin-in-the-game commitment?

The Chicago Fed report recommends that a CCP's skin-in-the-game be prefunded and on deposit with the appropriate central bank. This provides assurance to prudential authorities, clearing members, market participants, and the public at large that the CCP's skin-in-the-game is not just a financial commitment that needs to be funded at a later date, potentially under the most adverse of circumstances.

When considering CCP contributions to default waterfalls, there are three CCP forms to consider:

- Quasi-national CCP.
- Demutualized CCP.
- Mutualized CCP.

Quasi-National CCP

Quasi-national CCPs are often found in emerging economies where the single largest stakeholder is either the government or the country's central bank. This type of structure instills investor confidence in emerging markets. As with all CCPs, the Chicago Fed report recommends that quasi-national CCPs include a CCP-funded junior tranche in the default waterfall prior to the clearing member guarantee fund and unfunded assessments tranche. The CPP-funded junior tranche should be large enough to absorb the default shortfall of a modest-sized clearing member so clearing members of such a CCP do not need to replenish their contributions to the clearing member guarantee fund after such a default.

Demutualized CCP

A demutualized CCP is part of a large for-profit financial corporation. Although profits for this type of CCP accrue to the benefit of the corporation's shareholders, the clearing members share in the default risk in a demutualized CCP as a precondition of membership.

The Chicago Fed report recommends that the CCP-funded junior tranche of a demutualized CCP should be large enough to provide both auction inducement and nuisance-avoidance deductible. The report also points out the senior tranche funded with a material amount of the CCP's skin-in-the-game provides not just readily available funding to recapitalize the junior tranche but also incentivizes the CCP to avoid undersizing the upper layers of the default waterfall since losses covered by the senior tranche result in losses to shareholders.

Mutualized CCP

Mutualized CCPs are put in place in some jurisdictions where regulators consider it beneficial to have a single CCP utility. This may occur in a jurisdiction that lacks financial infrastructure but where certain banks and financial institutions find it useful to create their own infrastructure to facilitate financial markets. In most cases, a mutualized CCP is owned and governed by its clearing membership and has very little, if any, profit motivation.

If the clearing members are the only shareholders of the CCP, then there is only one source of funds for the default waterfall. A mutualized CCP may still have both junior and senior tranches, but both tranches are clearing-member funded.

The Chicago Fed report suggests that a mutualized CCP should still consider a junior tranche as part of its default waterfall structure. The junior tranche serves the purposes of auction inducement and nuisance avoidance and could spare clearing members from having to replenish their contributions to the mutualized clearing member guarantee fund in the event the CCP-funded junior tranche does not cover the default. A mutualized guarantee fund is funded with contributions from clearing members proportional to the risk of their positions and sized in accordance with the CCP's guaranty fund methodology (see Central Clearing: Proven, Transparent, Regulated Means of Reducing Systemic Risk).

If the mutualized CCP chooses to have a junior tranche, the senior tranche at the bottom of the default waterfall would serve to prefund necessary replenishments of the junior tranche whenever it is depleted.

Table 2: Clearing Member Defaults

Evidence shows that it is rare that a default penetrates further than the defaulting party's posted IM. Clearing member defaults are also rare. The table below demonstrates that the CCP defaults that have occurred would have been covered by defaulter's resources plus a junior tranche of $100 million. The table also indicates that about half of the defaults over the past three decades were covered entirely by the defaulter's IM and contribution to the guarantee fund.

TABLE 2

Clearing member defaults

Defaulting clearing member	Year	Clearinghouse	Default Loss	Loss exceeded defaulter's resources?
Volume Investors Corporation	1985	Comex Clearing Association	$9 million	Y
H. B. Shane	1987	The Options Clearing Corporation	$8.6 million	Y
Multiple firms	1987	Futures Guarantee Corp.	Exact figure unavailable	Y
Jordan Sandman Futures Ltd.	1989	New Zealand Futures and Options Exchange	GBP 1 million	Y
Drexel Burnham Lambert Limited	1990	LCH.Clearnet	Exact figure unavailable	N
Woodhouse, Drake and Carey (Commodities), Ltd.	1991	LCH.Clearnet	GBP 900,000 (before taking into account defaulter's resources)	N
Lee B. Stern & Co.	1992	Board of Trade Clearing Corporation	Exact figure unavailable; Stern & Co. missed a $9 million margin call	Y
Barings Futures (Singapore) Pte Ltd.	1995	SIMEX	Exact figure unavailable; resources held exceeded default losses by $86 million	N
Barings Securities (Japan) Ltd.	1995	Osaka Securities Exchange	Exact figure unavailable	Unavailable
Klein and Co. Futures, Inc.	2000	New York Clearing Corporation	Exact figure unavailable; Klein and Co. missed a $10 million margin call; NYCC spent $4 million to protect customers from loss	Y
Lehman Brothers	2008	LCH.Clearnet	Exact figure unavailable	N
MF Global UK Limited	2011	LCH.Clearnet	Exact figure unavailable	N
Cyprus Popular Bank Co. Ltd.	2013	LCH.Clearnet	Exact figure unavailable	N
HanMag Securities	2013	Korea Exchange (KRX) CCP	KRW 46 billion	Y
Maple Bank GmbH	2016	LCH.Clearnet	Exact figure unavailable	N

Cover-Two Default Loss Probability

The Chicago Fed report notes that systemically important CCPs are required by international standards to size their financial resources to withstand the contemporaneous demise of their two largest clearing members. This is known as the cover-two standard, which is examined in an annex to the report. Applying the cover-two standard, the report calculates the probability of the largest and second-largest clearing members of a CCP defaulting in the same week of the same year. The two critical parameters of the calculation are the credit rating of the two clearing members and the correlation or interdependence of the two defaulters.

The report considers two clearing members with an initial credit rating of BB, which implies a default probability of 0.0094, based upon historical data from 1990 through 2014 provided by Fitch Ratings. If the default probabilities of the number one and number two clearing members are uncorrelated – that is, their businesses are completely independent from one another – the probability that, over the course of a year, they both would default in the same week is 0.0000017.

However, it is unlikely the default probabilities are uncorrelated. The report attempts to calculate the probability that the number one and number two clearing members will both default in the same week if their defaults are correlated. Assuming a correlation factor of 0.85 and an initial credit rating for each member of BB, it computes the probability of joint default in the same week of the year as 0.0080.

IOSCO Supervisory Stress Tests

The **International Organization of Securities Commissions** (IOSCO) issued a press release laying out the framework for supervisory CCP stress testing. According to the IOSCO framework, a supervisory stress test (SST) is designed and executed by authorities. According to IOSCO, conducting a multi-CCP SST could help authorities better understand the scope and magnitude of the interdependencies between markets, CCPs, liquidity providers, and custodians.

PRODUCTS

PLC US Finance, PLC US Financial Services, PLC US Law Department