

# XVA Metrics for CCP Optimisation

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In the aftermath of the 2008-09 global financial crisis, the banking regulators undertook a number of initiatives to cope with counterparty risk. One major evolution is the generalization and incentivization of central counterparties (CCPs).

A CCP serves as an intermediary during the completion of the transactions between its clearing members, which are typically the broker subsidiaries of major banks. The portfolio of a CCP clears, i.e., in terms of mark-to-market, the CCP is only an interface between the clearing members. The mandates of the CCP are to centralize the collateralization and settlement of transactions and to rewire or liquidate, in the few days following the default, the CCP portfolio of a defaulted clearing member.

Collateral comes in two forms. The variation margin (VM), which is typically re-hypothecable, tracks the mark-to-market of a portfolio. The initial margin (IM) is an additional layer of margin, typically segregated by the CCP, which is meant as a guarantee against the risk of slippage of a portfolio between default and liquidation. Apart from the variation and initial margin that are also required in bilateral trading (as gradually implemented since September 2016, regarding the IM), the clearing members contribute to a mutualized default fund set against extreme and systemic risk. See Khwaja (2016) for a review of margin and default schemes used by different CCPs on different asset classes.

CCPs are typically siloed into CCP services dedicated to the clearing of specific asset classes. In the case of spot CCP services, the mandate of the CCP reduces to the carry of the settlement risk during the few days between the inception and the settlement of each transaction. In the case of derivative services addressing long-dated products, the margins and the default fund mitigate counterparty risk and the related CVA (credit valuation adjustment). In a CCP setup, the latter is the expected cost triggered by the liquidation of the defaults (if any) of the clearing members. But the margins and the default fund also generate substantial MVA (margin valuation

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adjustment) and KVA (capital valuation adjustment). These are the respective costs for the clearing members of funding their initial margin and of their capital tied up in the default fund. The XVA analysis of Armenti and Crépey (2017) reveals several inefficiencies in the current design of CCPs and in the related regulatory framework:

- Ambiguous nature of the default fund contributions, between “defaulter pay” collateral and “survivor pay” capital at risk, but tied up for sure in the default fund and not remunerated at a hurdle rate;
- Vexing modeling situation for the clearing members, which are not even in a position of estimating their costs and risks with accuracy, by lack of knowledge on other clearing members’ positions and on the default fund (sometimes even initial margin) model used by the CCP;
- Potentially high cost of raising funding initial margins, if funded by unsecured borrowing;
- The IM funding risk is not capitalized under the current regulatory (Cover 2) specification of the default fund.

The present paper explores two possible ways, suggested in the inspiring note by Albanese (2015), out of these shortcomings.

First, we point out an organization of a clearing framework, whereby a CCP would also play the role of a centralized XVA calculator and management center. The CCP would also remunerate its members at some target hurdle rate for their default fund contributions, which would be pure capital at risk of the clearing members. Moreover, we confront the current default fund Cover 2 EMIR sizing rule with a broader risk based approach, relying on a suitable notion of economic capital of a CCP. Such an approach was already advocated in Ghamami (2015), but restricted to default losses (as opposed to also IM funding expenses as well as CVA and MVA volatility swings in our paper), in a static setup, and without any numerics.

Second, we compare the margin valuation adjustments (MVAs) resulting from two different initial margin raising strategies. The first one is unsecured borrowing by the clearing member. As an alternative, the clearing member delegates the posting of its initial margin to a so called specialist lender, which, in case of default of the clearing member, receives back from the CCP the portion of IM unused to cover losses. The alternative strategy results in a significant MVA compression.

A numerical case study that the volatility swings of the IM funding expenses can even be the main contributor to an economical capital based default fund of a CCP. This is an illustration of the transfer of counterparty risk into liquidity risk triggered by extensive collateralization.

Note that the two proposals discussed in this work have already some incarnations in the industry. A default fund approach along the lines advocated in this paper (but with capitalization restricted to default losses as in Ghamami (2015)) has been used by

the Swiss CCP SIX<sup>1</sup>. See also Albanese, Brigo, and Oertel (2013) for similar ideas and previous industry attempts regarding the variation margin (VM). However, specialist lender funding schemes are much more difficult to implement for VM, because VM is far larger and more volatile than IM.

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<sup>1</sup>See <https://www.six-securities-services.com/dam/downloads/clearing/clearing-notice/2017/clr-170420-clearing-notice-margin-en.pdf>.