

CCP12 PRIMER ON INITIAL MARGIN

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A CCP12 WHITE PAPER



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1. ABOUT CCP12

CCP12 is a global association of 35 members who operate more than 50 individual CCPs globally across EMEA, the Americas and the Asia-Pacific region. CCP12 aims to promote effective, practical and appropriate risk management and operational standards for CCPs to ensure the safety and efficiency of the financial markets it represents. CCP12 leads and assesses global regulatory and industry initiatives that concern CCPs to form consensus views of its members and seeks to actively engage with regulatory agencies and industry constituents through consultation responses, forum discussions and position papers.

2. EXECUTIVE SUMMARY

Central counterparties (“**CCP**”s) require their clearing members to deposit initial margin for a wide range of instruments to protect against future risk exposures if a clearing member defaults on its obligations. The initial margin requirements collected by CCPs are one of the critical layers of their financial resources to cover counter-party credit risk arising from the potential default of a clearing member(s). Therefore, it is important that the initial margin requirements that a CCP imposes on its clearing members are adequate and appropriate for the markets cleared.

This paper aims to provide background and context on initial margin. It introduces the role and objective of initial margin in the context of a CCP’s overall risk management approach (Section 2), sets out the regulatory expectations on a CCP’s initial margining framework (Section 3), discusses the key features of initial margin models (Section 4) and finally, describes back testing methods employed by a CCP, as this is one of the primary tools used to monitor the adequacy of initial margin performance (Section 5).

3. INTRODUCTION

3.1. WHAT IS INITIAL MARGIN?

Initial Margin is collateral posted to a CCP by clearing members to protect against future risk exposures for their open positions. It is a key line of defense in a CCP's financial safeguards package. In some cases, prior to the acceptance of contracts for clearing, each clearing member is required to post collateral to the CCP. The collateral posted is to meet initial margin requirements based on the risk the given clearing member brings to the clearing house. The initial margin requirements are calculated in order to cover potential liquidation costs during adverse market moves in the expected closeout period of default management. Hence, it protects the CCP and its clearing members against losses from the potential default of its clearing members.

3.2. WHY IS INITIAL MARGIN IMPORTANT?

For every trade, a CCP acts as a buyer to every seller and a seller to every buyer, either at the time of trade or through novation of contracts. The assumption of trade counterpart by a CCP leads to multilateral netting effects, which reduce credit risk exposures normally faced between a seller and a buyer. While multilateral netting can substantially reduce the risk exposures faced by a CCP, the residual risk must be managed in order to guard against one or more of its clearing members defaulting. It is critical that each CCP maintains sound risk management frameworks and adopts appropriate risk management tools in order to ensure that they continue to meet their obligations in the event of a clearing member default. If a default were to occur, the defaulting clearing members initial margin acts as the first layer of defense against losses arising from the liquidation of the defaulter's portfolio.

3.3. DETERMING AMOUNT OF INITIAL MARGIN

CCPs routinely calculate initial margin requirements using market data, such as historical prices of instruments and current positions. The initial margin requirements are recalculated and collected from clearing members at least daily. Depending on their markets and products, many CCPs collect initial margin from members on an intraday basis.

4. REGULATORY EXPECTATIONS FOR INITIAL MARGIN

A CCP should identify and consider a number of elements in designing a framework for initial margin. The Principles for Financial Market Infrastructures (“**PFMI**”) produced by the Committee on Payments and Market Infrastructures and the International Organization of Securities Commissions (“**CPMI-IOSCO**¹”) provide a principles-based framework for CCP risk management which CCPs should follow, subject to and based on the local implementation in their given jurisdiction(s).

4.1. INITIAL MARGIN DESIGN

As prescribed in the PFMI, initial margin models may comprise a number of components. These components frequently include a model, such as value-at-risk or other statistically risk based estimates, designed to capture the potential price movements and other relevant factors of cleared products. A CCP should also ensure prudent risk management by covering risks such as liquidity, concentration, de-correlation and idiosyncratic risks, where appropriate.

¹ *Previously known as CPSS-IOSCO*

4.2. NO ONE-SIZE-FITS-ALL APPROACH

Different markets and products available for clearing may be more or less suited to certain model choices and settings, i.e. there is no one-size-fits-all solution for initial margin. A CCP typically considers initial margin models holistically when it sets its risk parameters (e.g. confidence levels, look back periods, initial margin scenarios, aggregation algorithm, etc.). Moreover, a CCP must focus on outcomes appropriate to the market in which they operate.

While each CCP might use a different approaches for scenario generation, such as Monte Carlo approach or historical simulation approach, these approaches are calibrated holistically to achieve similar risk management objectives that are appropriate for the products they clear and are consistent with best practices for initial margining by calibrating parameters for the outcome intended.

4.3. CONFIDENCE LEVELS AND MARGIN PERIOD OF RISK

Two prominent parameters of most initial margin approaches are the confidence level and the margin period of risk (“**MPOR**”). According to Principle 6 of the PFMI, initial margin for derivatives should meet an established single-tailed confidence level of at least 99% with respect to the estimated distribution of future exposure.

Another component is the MPOR or the closeout period that a CCP assumes in its initial margin model. MPOR or closeout period is the estimated length of time that it takes to neutralize the market risk of a defaulting clearing member’s portfolio, either through liquidation or through hedging.

Depending on the types of product and the risks of a defaulter’s portfolio, a longer MPOR tends to produce higher initial margin requirements. Depending upon the market, liquidity, price and other characteristics, the appropriate MPOR for cleared instruments may vary by clearing service. The MPOR is typically shorter (i.e. 1 or 2 days) for exchange traded markets due to the market depth and generally deeper liquidity.

4.4. TIME HORIZON – SAMPLE LOOK BACK PERIOD

Most initial margin models are based on historical market moves and it is important to ensure that the historical market moves are representative of what can potentially occur given current market circumstances. There might be a need to include a variety of market conditions such as periods of market stress and periods of extreme correlation change. Where historical price data are limited or there is a lack of stressed observations these can be injected by way of proxy data or simply adding weighted stress scenarios.

The historical look back period can influence the stability of the model, in the sense that margin requirements may be too reactive, both upwards and downwards, if the historical look back period is too short. The term for this is procyclicality and is covered in section 4.6.

CCPs need to find the right balance of the degree of historical market moves to include any initial margin model through back-testing analysis. The choice of a historical sample period should be based on the consideration of explicit factors relating to the characteristics of the relevant cleared products, including potentially (i) the need to accurately estimate model parameters or model outputs; (ii) the need to accurately model the potentially complex dependencies between cleared products; (iii) seasonality in historical data; and (iv) the need to be representative of market conditions where consistent with the default of a clearing member.

4.5. PORTFOLIO INITIAL MARGINING AND RESTRICTIONS ON OFFSETS

A CCP that uses a portfolio approach to calculate initial margins should identify, document and apply clear criteria when determining which products are correlated and, therefore, potentially eligible for portfolio initial margining, including criteria to evaluate whether portfolios may be reliably liquidated and risk-managed on a consolidated basis in the event of a clearing member default.

Risk-based initial margining was a key evolutionary step in developing a more capital-efficient approach to set initial margins. It takes into account the overall risk of the products in a portfolio by recognizing that some of the risks offset which are modeled with significant and reliable correlation patterns consistent with Principle 6 of the PFMI. In order to provide risk offsets, the significance and reliability of products' correlation should be demonstrated on an economic and statistical basis. Portfolio initial margining provides a much more accurate estimate of the likely worst-case loss (to some defined statistical confidence level) of the overall portfolio.

To enhance risk management, CCPs should distinguish between products that naturally hedge each other and those that provide portfolio diversification effects, i.e. lower correlation.

4.6. PROCYCLICALITY

Principle 6 of the PFMI emphasizes that a CCP's initial margin model should limit the need to make procyclical changes to the extent possible. Significant changes to initial margin levels following changes to market volatility may have procyclical impacts on market participants and can exacerbate market stressors. Therefore, CCPs should adopt measures to prevent and control possible procyclical effects of their risk management practices to the extent practicable and prudent in light of the CCP's soundness and financial stability.

The PFMI acknowledge that the procedures designed to limit the need for procyclical changes may create additional costs for market participants in periods of low market volatility, but these procedures may also result in additional protection and potentially less costly and disruptive adjustments in periods of high market volatility. To address procyclicality concerns, a CCP incorporates elements into its initial margin methodology that mitigate the need and likelihood of large or unreasonable changes in initial margin levels due to volatility. For instance, CCPs can (i) utilize floors on the initial margin rate, amount, or risk factors, (ii) install a buffer which is adjusted lower as volatility increases; (iii) include data from stressed market episodes in the initial margin methodology; and/or (iv) increase the look-back period.

Imposing floors can limit declines in initial margin rates in periods of low volatility, so that initial margin rates are less likely to increase drastically when volatility increases (ore vice-versa for decreases in volatility). Including stressed market episodes in the lookback period results in higher initial margin requirements, even when current market conditions are relatively stable.

4.7. FREQUENCY OF MARGIN CALLS

All CCPs utilize a regular end of day initial margin call, with some having one or more regular intraday cycles. In addition, a CCP should have the ability to call for intraday margin, as described by the PFMI. Principle 6, KC 4 states that a CCP should measure its exposures at least once a day and should have the operational ability to measure its exposures on an intraday basis. A CCP should not only measure its exposures, but also take action if necessary. Intraday margin provides a CCP with an additional line of defense against a clearing member's default. During the trading day, the CCP could request its clearing members to deposit additional collateral to mitigate risks from event driven / price driven triggers.

5. KEY FEATURES OF INITIAL MARGIN MODEL

The models used to estimate initial margin, the parameters used in models, and the composition of clearing members' portfolios vary across CCPs. The approaches set out below are commonly used by CCPs to calculate their initial margin requirements.

5.1. APPROACHES OF INITIAL MARGIN MODEL²

(i) Haircuts

A haircut can be used where a CCP estimates the value at which it can buy or sell a security. It is expressed as the percentage discount applied to the market value

² These approaches are for illustrative purposes only and are not exhaustive.

of securities during collateral valuation. It is a simple and transparent method that CCPs may use. It is most widely used for clearing securities.

(ii) Standard Portfolio Analysis of Risk (SPAN)

SPAN is used by many CCPs and is more of a framework for calculating initial margin rather than a model in itself. SPAN utilizes a parametric approach to simulate various scenarios for a given portfolio, where each scenario represents product level changes in the underlying price and/or implied volatility as well as correlation across tenor and products. CCPs may calibrate parameters using models that are appropriate for their markets, including value-at-risk, expected shortfall, and Monte Carlo based methodologies.

(iii) Filtered Historical Simulations (FHS)

In a Filtered Historical Simulation³ model, the initial margin requirement is calculated by valuing the clearing member's portfolio by simulating price moves. Typically this model uses historical returns, but multiplies them by scaling factor based on current conditions (e.g. volatility) for forecasting changes in returns and risk thereof. This technique is widely used in the finance industry. Two different statistical measures are commonly used to determine the initial margin including Value-at-Risk (VaR) and expected shortfall.

(iv) Monte Carlo Simulation

Monte Carlo modelling can be used to estimate future potential portfolio loss values. For instance, Monte Carlo methods are often employed to risk forecasting for fixed income securities and their derivatives. While Monte Carlo serves as means to establish a rich data set, it can be used in conjunction with other models such as filtered historical simulation.

³ There are many academic researches on FHS. For example: J. Hull, A. White, *Incorporating volatility updating into the historical simulation method for Value-at-Risk*. *Journal of Risk*, Volume 1, 1998

5.2. REPLICATION AND INDUSTRY ENGAGEMENT

The initial margin models at CCPs are usually developed with market stakeholder feedback, which includes clearing member engagement. This can happen through various means:

- Formal consultations with white papers and questionnaires soliciting feedback prior to the launch of a new model, or substantive changes to an existing one;
- Bilateral deep dives with risk and financial engineering experts from clearing members;
- Risk working groups where multiple clearing members send technical experts to assess the model;
- Risk committees which have representatives of the industry, including clearing members; and/or
- Regulatory engagement and approval.

Clearing members replicate a CCP's initial margin calculation either themselves, through an in-house solution, via a third-party software vendor, or in some cases using a facilities management provider. Many CCPs also provide clearing members with tools to simulate their initial margin requirements. These tools help increase the transparency and predictability of initial margin, whereby clearing members are better able to anticipate changes in margin and prepare funding.

An initial margin simulation tool should typically be able to model the following:

- The initial margin for a given portfolio;
- The additional initial margin required to clear additional trades; and/or
- The initial margin required to clear a given trade on a standalone basis.

5.3. CONCENTRATION, LIQUIDITY AND OTHER RISKS

Although initial margin approaches take into account potential market moves during a liquidation horizon, many CCPs also utilize additional techniques to capture greater

market moves resulting from large or relatively large positions. These add-ons are generally referred to as concentration or liquidity margin.

The inclusion of those risks is designed to ensure that the initial margin required is commensurate with the overall risk profile of the portfolio, including liquidation and/or hedging costs. Initial margin add-ons are very important to capture risks that are not incorporated in the core initial margin model. These risks are often portfolio and/or clearing member specific and can be more challenging to model.

The add-ons require market information and consultation with market participants, where appropriate for the market cleared. Concentration charges and liquidity add-ons also require detailed reviews of actual and hypothetical portfolios, in order to calibrate the add-ons for a variety of portfolio types i.e. hedged, directional, spreaders, etc.

5.4. INTRADAY MARGIN CALLS

As an additional line of defense, many CCPs have the capacity to make intraday margin calls to capture changes to prices and/or positions. When clearing new trades, a CCP is able to request its clearing members to deposit additional collateral to mitigate risks from increased exposures.

In general, there are three types of intraday margin calls, namely:

- (i) a routine intraday margin call at a set time;
- (ii) price-driven triggers to call at pre-defined, transparent thresholds; and
- (iii) a selective, or ad-hoc, margin call, which requires the deposit of additional collateral by one or more clearing members, whose variation losses or initial margin deficits have reached a certain threshold.

6. BACK TESTING

6.1. DEFINITION AND PURPOSE

In addition to sensitivity testing and procyclicality performance testing, as prescribed in PFMI, back testing is also an important technique that a CCP utilizes to ensure that its initial margin model is performing as expected and that the assumptions within the model are valid. A CCP should assess its initial margin coverage by performing an ex-post comparison of observed profit and loss moves of a given portfolio against the initial margin collected. Such back testing analysis is performed each day in order to evaluate whether there are any testing exceptions to initial margin coverage. Coverage shall be evaluated on current positions for financial instruments for all clearing members.

To aid in this process, CCPs identify their risk appetite in order to review the adequacy of initial margin requirements in terms of size and/or number of breaks allowed in the initial margin calculation. According to the PFMI, 99% coverage of back testing is used as a benchmark to assess the efficiency of initial margining model, though a CCP may use a higher (percentile) benchmark.

6.2. REVIEW OF BACK TESTING DATA

If the number and level of exceedances is beyond of the CCPs' risk appetite over a specific period of time, a CCP would take the following actions:

- (a) evaluate the source of back-testing exceedances and recalibrate the initial margin model parameters (e.g. confidence levels, number of scenarios etc.) when necessary; and
- (b) consider temporary mitigating measures i.e. add-ons or multipliers to Initial Margin levels.

Results of the daily back-testing are routinely reported and evaluated by governance committees of the CCP to ensure the model is operating within predetermined risk appetite and other applicable risk policies. CCPs perform independent model validation

on a periodic basis and put an appropriate governance framework for initial model change control, performance monitoring, and escalation procedures. The validation assesses the robustness and effectiveness of the initial margin methodology and back-testing model.

Also, material changes to the initial margin methodology are routinely reviewed in consultation with risk committees or risk working groups. The stakeholder feedback from the consultation should be considered by the CCP formally in their decision-making process.

6.3. POLICY CONSIDERATION & TRANSPARENCY

Regulatory standards allow CCPs to design their risk management models to the markets they serve, in particular precisely balancing between reliance on initial margin and mutualized default fund resources provided that the initial margin is sufficient to meet their defined minimum confidence level. Hence, CCPs should follow applicable regulatory standards while setting the optimal level and composition of their default resources based on the specific risks of the markets and portfolios that they clear.

As prescribed by the PFMI, CCPs should provide relevant information to participants, relevant authorities and the public. Hence, CCPs should ensure the disclosure of back-testing results of initial margin is accurate and subject to appropriate quality control. At a minimum, this includes for each clearing service and each initial margin model applied to that clearing service:

- (a) Number of times over the past twelve months that initial margin coverage held against any account fell below the actual marked-to-market exposure of that member account – based on daily back-testing results⁴;
- (b) Number of observations (i.e. number of accounts multiplied by number of days covered in the back test); and
- (c) Achieved coverage level.

⁴ Specify if measured intraday/continuously or only once a day. If once a day, specify at what time of day.

7. CONCLUSION

Initial margin is fundamental to how a CCP manages risk. The members of CCP12 use robust and effective risk-based margining methodologies. Thus, ensuring that every CCP improves the overall safety, resilience and general soundness of the financial markets by protecting against losses should one or more clearing member's default. Moreover, the methodologies support the G20 reform from 2009, to safeguard against the risks to financial stability as that were encountered in the Global Financial Crisis in 2008⁵.

The methodologies employed are subject to appropriate governance, and routine validation and review, to ensure the methodologies are effective. Furthermore, CCP12 members provide routine qualitative and quantitative information, based on a standardized reporting framework⁶. The information given by CCP12 members provides the markets with a high degree of transparency around the robustness of the models employed.

In case of questions, send a mail to office@ccp12global.com. For further information on CCP12, visit the CCP12 website, www.ccp12.org.

⁵ http://www.fsb.org/wp-content/uploads/g20_leaders_declaration_pittsburgh_2009.pdf

⁶ <http://ccp12.org/the-ccp12-template-for-public-quantitative-disclosures-for-CCP's-3/>

8. CCP12 MEMBERS

