

Public Disclosure of Risk Management Systems, Test Policy and Model Validation

Securities Market

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Table of contents

1	Models to be validated and applied methodology	2
1.1	Margin calculation	2
1.2	Default fund calculation.....	2
1.3	Overall available resources	3
1.4	Collateral.....	3
1.5	Default procedures	3
2	Testing programs	5
2.1	Back tests.....	5
2.2	Stress tests.....	5
2.3	Reverse stress tests.....	6
2.4	Sensitivity tests	6
2.5	Insolvency tests.....	7
2.6	Assessment of results	7
3	Summary of test results	8

Introduction

Art 49 EMIR sets several requirements to ensure that the models used for margin calculation and default procedures are based on solid assumptions and reflect the reality as much as possible. Key points of these requirements are:

- a) Execution of tests and analysis of results
- b) Information to national competent authority Finanzmarktaufsicht (FMA)
- c) Integration of clearing members
- d) Public disclosure of key aspects

ESMA has detailed these key aspects in the regulatory technical standards (hereinafter RTS) in the delegated Regulation (EU) No 153/2013, Chapter XII, Art 47-57. CCPA has implemented a policy for tests and model validation to comply with Art 49 EMIR and the standards defined by ESMA. This document gives an overview of the applied procedures.

1 Models to be validated and applied methodology

1.1 Margin calculation

All clearing members of CCPA must deposit collateral for securing the clearing risk. The margin requirements are calculated at least daily based on the balance of open trades (open positions) and risk parameters using risk-based margining.

The margin requirements are calculated on instrument level on each margin account, CCPA does not consider correlations between different instruments to reduce the margin requirement.

Basic calculation steps are:

- ◆ Net open positions on margin account
- ◆ For each instrument of the position
 - ◆ Calculate current value (current close-out cost if position will be liquidated immediately) on instrument level
 - ◆ Calculate potential additional close-out (if position will be liquidating at t+3) under assumption of price changes up to x% (margin parameter) in the worst-case scenario
- ◆ Add the two liquidation values to determine the basic risk per instrument and position
- ◆ Add basic risk margin requirement of all instruments
- ◆ Multiply result with member rating factor and procyclicality buffer to obtain final margin requirement for each margin account

Important parameters	
Holding period (cash market)	3 days
Look-back period for margin parameter calculation	250 and 600 days
Confidence level	99%

All margin parameters (i.e. r-factor on cash market) are published on CCPA's website.

For details regarding the calculation, see [Margin Calculation Methodology](#).

To **validate its margin model**, CCPA uses back testing and sensitivity testing. Back testing is fully automated and is performed daily. Sensitivity testing is automatically performed on a daily basis, the identification of the day with the highest exposure and the analysis of results is done manually on a monthly basis.

1.2 Default fund calculation

CCPA's default fund is calculated to cover the simultaneous default of the three largest clearing members. The methodology on how the total size of the default fund is determined and the allocation of the total amount to the individual clearing members is published in the [Public Information on default fund Calculation](#).

To **validate its model for computing the default fund contributions**, CCPA uses back testing, stress testing and reverse stress testing. The back testing as well as the stress testing process is fully automated and is

performed daily. The reverse stress testing is also fully automated and executed on daily basis, the evaluation of results takes place quarterly.

1.3 Overall available resources

The total available resources to cover defaults consist of margin requirements, default fund contributions and CCPA's own resources. The order of usage is compliant with the waterfall principle defined in EMIR (see [Default Waterfall](#)).

To **validate the overall resources** of the default waterfall, the results of the stress tests and reverse stress tests are used.

1.4 Collateral

Each member has to fulfil its margin requirements and default fund contribution with assets according to CCPA's [Collateral Policy](#) that defines which collateral assets are eligible and how these assets are valued.

To **validate the Collateral Policy** (collateral evaluation), the adequacy of the accepted collateral and the applied haircuts are reviewed regularly. This is done by analysing the price series of the pledged securities. For instruments tradeable at WBAG, prices (including PWTs¹ and reference prices) of WBAG are used. For other instruments, prices are provided by OeKB AG (i.e. prices from the vendor Telekurs, which were concluded at the home market (first priority) or the market Frankfurt (second priority)). The parameters used by CCPA's [Collateral Policy](#) are benchmarked against those parameters published by ECB on their list of eligible collateral. This is done on a monthly basis.

1.5 Default procedures

The procedures that CCPA undertakes in the event of a clearing member's default, are summarized in the document [Procedure in the Event of Member Default](#).

CCPA's rules stipulate the circumstances under which CCPA will declare a default and what kind of action will be taken for each kind of default. The basic steps are:

1. CCPA declares default of a clearing member
2. CCPA immediately informs WBAG
3. WBAG will suspend the member (and allocated Non-Clearing Members and Registered Clients) from trading immediately
4. FMA is informed
5. Penalty fees have to be paid to the Austrian government according to exchange law
6. CCPA ports the positions and assets of segregated accounts as far as possible
7. Remaining positions will be liquidated using resources according to the default waterfall
 - a) Cash collaterals and all cash balances from defaulting member
 - b) Securities deposited as collateral and securities from defaulting member
 - c) Contributions to the clearing fund from defaulting member
 - d) Own dedicated sources of CCPA

¹ PWT = price without turnover

- e) Contributions to the default fund from non-defaulting members on pro rata basis

To **validate the general default procedures** and to ensure that members are familiar with the default procedures, CCPA simulates a default of a clearing member in its simulation environment using a predefined screenplay, including some “what if” scenarios. To the extent possible, members are integrated in this simulation (e.g. portability of assets and collaterals).

2 Testing programs

2.1 Back tests

The purpose of back testing is to check the adequacy of the margin calculation on each margin account. Back testing is performed on 2 functional levels.

- ◆ Level 1: Back test of margin requirement
- ◆ Level 2: Back test of margin parameters

Level 1: The margin requirements should cover the close-out value (net profit and loss) of a portfolio within a confidence level of 99% under all circumstances, i.e. the change of the portfolio value between t and $t+n$ of the portfolios of the clearing members.

In the back testing the margin requirement for a portfolio on a margin account on a given past day t is being compared with the close-out value of that portfolio on $t+n$, thus measuring whether the initial margin requirement computed at t would have been sufficient to cover for losses incurred after n days. A net loss exceeding the margin requirement is defined as “uncovered loss”. The allowed number of breaches is defined by the CRO and should be consistent with the applied confidence level chosen by CCPA.

The model is adequate, if the observed number of breaches is equal or lower than the expected breaches given for the specified confidence interval. A higher number of breaches gives an indication of an underestimation of the potential close-out cost. In this case, the parameters of the margin model shall be adjusted. It may also be necessary to analyse whether the margin algorithm is adequate for a given instrument type.

Level 2: CCPA regularly performs tests on the appropriateness of the r -factors. Therefore, the daily price variation (from t to $t+2$) of all traded instruments is compared to the r -factor applied on t . This is done monthly, taking into account the close prices of these instruments in the past 12 months.

If the price variation is higher than the applied r -factor, a breach is counted. The number of observed breaches shall support the null hypothesis “The applied r -factor is sufficient to cover $T+2$ price variations at a confidence level of 99%” at a significance level of 5%.

2.2 Stress tests

Art 51 EMIR states that a CCP shall perform stress tests to estimate the exposure of the n largest members in extreme but plausible events. Stress tests provide information on risk exposure under stressed market conditions and give information on financial capacity which will be needed to cover the default of one or more member in stressed market conditions.

The standard stress tests for cash market instruments are based on shocking the variations of the instrument price.

The standard stress factor to stress the prices is determined by:

1. Analysing the historic trade prices
2. Analysing the historic fair value prices (like “PWT”, “NAV”) provided by issuers
3. Hypothetic assumptions on potential price variations

Additional specific stress scenarios may be used to determine stressed prices of:

- ◆ Instruments traded in non-EUR currency but settled in EUR (currency rate stress scenarios)
- ◆ Bonds (interest rate stress scenarios)
- ◆ Instruments issued by a defaulting issuer

Standard stress scenarios are created for an upside price scenario and a downside price scenario and include observed data (nth largest shock in a given time frame (historical observation approach) as well as hypothetical scenarios like "k" times the size of the r-factor (r-factor approach) or a third approach based on statistics, using "d" times the standard deviation (standard deviation approach)).

2.3 Reverse stress tests

Art 60 EMIR states that a CCP shall conduct reverse stress tests which are designed to identify under which circumstances the combination of margin, default fund plus other financial resources may provide insufficient coverage of credit exposure and for which its liquid financial resources may not be sufficient.

The reverse stress test methodology consists of a reprocessing of the stress tests using a "trial and error" approach until the objective is met. The relevant risk factor (which is the price for cash market instruments and the settlement price for derivatives) will be shocked by applying a factor to it (e.g. current price * 1,5).

The results of the reverse stress tests enable CCPA to identify the market conditions under which a predefined threshold (in EUR) is reached. The threshold marks the break-even-point between available financial resources and necessary resources to cover the simultaneous default of n clearing members.

2.4 Sensitivity tests

Art. 50 EMIR states that a CCP shall conduct sensitivity tests to assess its margin coverage under various market conditions using historical data from stress tests made.

Such an analysis shall be performed on a number of portfolios and shall be designed to test key parameters of the initial margin model. The test shall include the simultaneous default of clearing members that issue financial instruments cleared by the CCP. For these test cases, the CCP shall evaluate the potential close-out values of clearing member positions.

The sensitivity test procedure is based on the execution of several margin computation iterations. The result of the iteration is a new set of r-factors and prices. CCPA performs its sensitivity tests concerning:

- ◆ Changes in confidence interval
- ◆ Delta % variation of the price for n securities issued by clearing members under the assumption of simultaneously default
- ◆ Delta % variation of the price of the remaining securities

The result of a sensitivity test is the margin requirement of a clearing member under the different sensitivity test market conditions, which include irregular price variations of several instruments issued by the defaulting clearing member.

This amount is compared to the available financial resources to cover the default of the three largest clearing members.

2.5 Insolvency tests

The purpose of the insolvency test is to simulate the default of a participant in the securities market in order to ensure that all processes function properly in the event of a clearing member's insolvency. CCPA tests the default management process which includes the activation of the default status, the suspension in the clearing system, the transfer of clients' positions and assets and the close-out of open (retained) positions as well as the communication processes. Additionally, different scenarios are considered each year for the annual test – default of a clearing member with omnibus account structure vs. a clearing member with individually segregated accounts.

CCPA offers the possibility to clearing members to participate in the insolvency tests. The default management process is also part of the clearing training for clearing members.

2.6 Assessment of results

CCPA has established criteria to assess whether its models, methodologies and liquidity risk management framework have been successfully validated. These criteria include the analysis of test results as well as clear statistical tests.

CCPA has defined the procedures to detail the actions it could take given the results of the tests.

3 Summary of test results

During the last twelve months, all tests have been performed and successfully validated according to CCPA’s test schedule. There was no evidence of any inappropriateness of CCPA’s models used for margin calculation, determination of the default fund size, liquidity needs and default procedures. No corrective actions have been taken.

Quantitative information, including basic test results, are published following the CPMI-IOSCO quantitative disclosure framework for CCPs on CCPA’s website: [CPMI-IOSCO Public Disclosure](#).

Table 1: Test results 2024

Test	Model to be tested	Objective	Frequency	Evaluation	Test result
Back test	Margin calculation model	To assess reliability of calculated margin requirements by comparing observed outcomes with expected outcomes.	Daily	Daily	Disclosed in IOSCO PQD (6.5.3 and 6.5.4)
Back test	Risk factor calculation model	To ensure that CCPA applies sufficient risk factors for margin calculation.	Daily	Monthly	In 2024 all necessary back tests were performed.
Back test	Haircuts applied on collateral assets	To ensure that CCPA applies sufficient haircuts on collateral assets to cover the fall in value during the assumed holding/liquidation period.	Monthly	Monthly	Disclosed in IOSCO PQD (5.3.4)
Liquidity stress test	Calculation of liquidity needs	To ensure that CCPA has sufficient liquid assets to cover settlement obligations toward CMs in case of the default of the two largest clearing members.	Daily	Daily	Disclosed in IOSCO PQD (7.3.2, 7.3.3, 7.3.6 and 7.3.7)
Stress test	Model for computing default fund and overall resources	To calculate the minimum size of the default fund.	Daily	Monthly/Quarterly	Disclosed in IOSCO PQD (4.1.4 and 4.1.5)

Simulation of events	Default procedures	To ensure default procedures are practical and effective.	Annually	Annually/On demand	The last fire drill on 13.11.2023 was successfully executed and validated.
Sensitivity test	Margin model	To determine sensitivity of key parameters of margin model taking into consideration the scenario of simultaneous default of clearing members, which issue financial instruments cleared by CCPA.	Daily	Monthly	<p>Sensitivity tests are performed daily, at the end of each month the test results from the day with highest exposure is evaluated.</p> <p>In 2024, yet, these dates were:</p> <ul style="list-style-type: none"> 29.01.2024 29.02.2024 15.03.2024 30.04.2024 02.05.2024 17.06.2024 26.07.2024 30.08.2024 18.09.2023 <p>All sensitivity tests were successfully validated in 2024, no corrective measures were required.</p>

Reverse stress test	Model for computing default fund and overall resources	To ensure that margin, default fund and skin-in-the-game are sufficient to cover the loss of the three largest clearing members.	Daily	Quarterly	<p>Reverse stress tests are performed daily, at the end of each quarter the test results from the day with highest exposure are evaluated.</p> <p>In 2023, yet, these dates were: 15.03.2024 17.06.2024 09.09.2024</p> <p>All reverse stress tests were successfully validated in 2024, no corrective measures were required.</p>
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