

QUESTIONS AND ANSWERS (Q&A) ESMA CCP STRESS TEST

The European Securities and Markets Authority (ESMA) has published today the results of its fifth system-wide stress test exercise regarding Central Counterparties (CCPs) which it conducted under the European Markets Infrastructure Regulation (EMIR). This Question and Answers (Q&A) document summarises the overall scope of the stress test exercise, the different scenarios and methodologies applied as well as how to understand the results.

Why are CCPs needed? Why is central clearing necessary?

Financial market infrastructures such as CCPs lie at the heart of the financial system. They help to reduce the risk of counterparties and provide post-trade transparency. CCPs sit between the buyer and seller of a transaction, leading to a less complex and more centralised system of exposures. CCPs effectively guarantee the obligations under the contract agreed between the two counterparties, both of which would be participants of the CCP. If one counterparty fails, the other is protected via the default management procedures and resources of the CCP.

Which CCPs did ESMA include in the stress exercise?

ESMA assessed the resilience of 16 CCPs, including all fourteen authorised EU CCPs as of May 2023 and the two third-country Tier 2 CCPs. These are:

no	CCP	CCP code
1	Athens Exchange Clearing House	ATHX
2	BME Clearing	BME
3	Cboe Clear Europe NV	CBOE
4	CCP Austria Abwicklungsstelle für Börsengeschäfte GmbH	CCPA
5	Eurex Clearing AG	ECAG
6	Euronext Clearing / Cassa di Compensazione e Garanzia S.p.A.	ENXC
7	European Commodity Clearing	ECC
8	ICE Clear Europe	ICEEU
9	ICE Clear Netherlands B.V.	ICENL
10	KDPW_CCP	KDPW
11	Keler CCP	KELER
12	LCH.Clearnet Ltd	LCHUK
13	LCH.Clearnet SA	LCHSA
14	Nasdaq OMX Clearing AB	NASDAQ

15	OMIClear – C.C., S.A.	OMI
16	SKDD-CCP Smart Clear d.d	SKDD

Who uses CCPs?

The CCPs included in the exercise have collectively close to 830 clearing members, which can also include multiple entities belonging to one group structure. Clearing members are mostly financial entities, such as banks and investment firms, but in some markets clearing members can also be non-financial companies. CCPs can indirectly be used by other financial or non-financial entities who act as clients of clearing members.

Why is ESMA conducting these tests? Why are CCPs potentially risky?

CCPs are connected to financial firms and the markets they clear, both locally and globally, which makes them a potential source of systemic risk. If a CCP would fail its clearing members and clients may face credit losses and liquidity risks, which may propagate through markets and financial systems. Given the systemic importance of CCPs, assessing their resilience is important to ensure sound and safe market infrastructures and promote financial stability. Stress testing CCPs' default waterfalls, both individually and system-wide, is an important supervisory tool to ensure the sector is safe and resilient to member defaults and market shocks.

Are ESMA's CCP stress tests similar to the ones of EBA and EIOPA?

The common aim of such system-wide stress tests is to assess the resilience of financial institutions to adverse market developments, as well as to contribute to the overall assessment of systemic risk in the financial system. Even if the overall aim of the stress tests is the same, there are differences between the three stress tests exercises due to the types of businesses and different risks faced by CCPs compared to banks, insurers, or pensions funds.

Why is ESMA testing CCPs' resilience now? Is ESMA concerned about specific issues?

EMIR requires ESMA to run periodic system-wide tests in order to assess the resilience of CCPs to adverse market developments. This is the fifth CCP stress test executed by ESMA.

When was the exercise conducted exactly, based on what data?

ESMA ran the exercise in different stages in H2 2023 and H1 2024, assessing the actual exposures of CCPs using data provided by the CCPs for two reference dates in December 2022 and March 2023. Following the definition of the [framework](#)¹ for conducting the exercise, CCPs provided in Q3 2023 the data for the stress test. National Competent Authorities (NCAs) of CCPs and ESMA validated the data before calculating the different stress scenarios. The Bank of England was also involved in the validation process for the two UK CCPs that participated in the stress test.

What exactly did ESMA test?

The stress test exercise has the following five components:

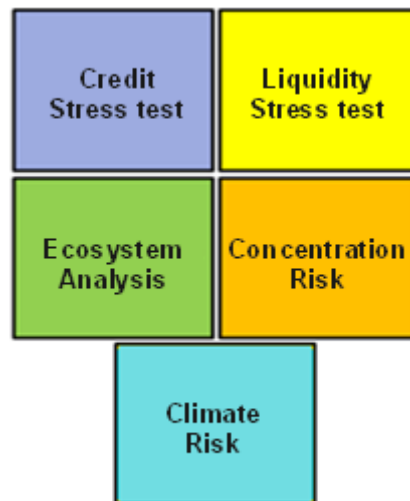


FIGURE: COMPONENTS OF THE STRESS TEST EXERCISE

ESMA tested the resilience of CCPs by exposing them to adverse market conditions. ESMA's stress test covered (i) *counterparty credit risk*, which CCPs may face because of multiple clearing members' defaults and simultaneous market price shocks; (ii) *concentration risk*, which concerns the additional cost of liquidating concentrated positions in a short period of time; (iii) *liquidity risk* to assess the sufficiency and timely availability of CCPs' liquid resources under a combination of market price shocks, member/liquidity provider default scenarios and additional liquidity stress assumptions; (iv) and for the first time *climate risk* which assesses the degree to which the CCPs' business models are affected by the transition to a carbon-neutral economy, the consequences of the transition on the collateral posted by clearing

¹ <https://www.esma.europa.eu/press-news/esma-news/esma-launches-fifth-stress-test-exercise-central-counterparties>

members, and the impact of physical risk on CCPs. An analysis of the ecosystem (v) has also been added to further explore the clearing landscape and its risks from four different angles.

Clearing member default scenarios

ESMA's stress test exposed CCPs to two different clearing members default scenarios, which include:

- The default of the two groups of clearing members system-wide with the largest aggregate exposures to all in-scope CCPs (**Cover-2 for all CCPs or system-wide**), which is designed to collectively test the resilience of CCPs as a system of financial infrastructures.
- The default of the top-2 groups of clearing members for each CCP (**Cover-2 per CCP**), which is designed to test the resilience of each CCP independently.

Market price shock scenarios

ESMA's stress tests applied extreme market price shocks to CCPs using the market stress scenario provided by ESRB for the purpose of this exercise. The scenario is common across all CCPs and is used for credit and liquidity stress tests.

In addition to the ESRB market scenario, ESMA introduced this year additional scenarios identified on the basis of CCPs' activity for the credit risk component to test an extended set of historical and hypothetical market stress and correlation breakdown assumptions.

Why is ESMA testing for simultaneous clearing members defaults and market price shocks?

From a counterparty credit risk perspective, a combination of clearing members defaults and simultaneous severe shifts of risk factor prices is needed to put a CCP at risk. If clearing members continue to post margin and meet their obligations, periods of extreme market volatility in isolation will not pose a specific market risk to a CCP. Similarly, defaults of clearing members without simultaneous adverse market shocks should not put a CCP at risk. Clearing members post margins and provide default fund contributions which together provide a very high confidence level. This should make sure that CCPs have sufficient resources to manage a default of a clearing member in normal market conditions and close out the resulting open positions in a stable market before suffering a loss. Therefore, under normal market conditions,

the CCPs will have the resources to withstand multiple defaults. Hence, from a counterparty credit risk perspective and with the exception of investment risks, only simultaneous defaults and extreme, adverse shifts of market prices could pose potential systemic risk to a CCP.

What is counterparty credit risk?

A key risk attached to financial market transactions is counterparty credit risk — the risk that one party to a contract defaults and cannot meet its obligations under the contract. This can lead to a loss for the counterparty on the other side of the contract. If those losses are severe enough, they may cause the affected parties financial distress, which, in turn, can have a knock-on effect for their creditors. CCPs were setup to reduce the counterparty credit risk stemming from bilateral relationships. But CCPs themselves are also exposed to this risk, as they become – with respect to a cleared transaction – the counterparty of two clearing members and are therefore exposed to risks arising from the default of one, or multiple, of its counterparties.

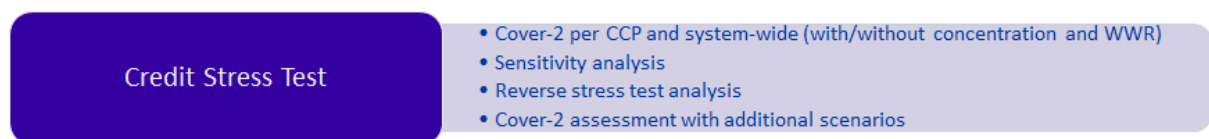


FIGURE: ELEMENTS OF COUNTERPARTY CREDIT RISK

Is counterparty credit risk the only risk that CCPs face?

CCPs are also subject to other types of risks, such as liquidity, investment (credit & market) operational and climate risks that could in isolation, or combined with counterparty credit risk, challenge their resilience.

Operational risk was covered in the past stress test exercise and has been paused for this exercise in order to focus on other risks such as climate.

What is concentration risk in this context?

For the purpose of this exercise, concentration risk represents the potential cost of liquidating or hedging the position of a defaulting clearing member in a short amount of time, particularly when the position is large relative to market capacity.

The market shocks defining the credit stress scenario apply to the mid-price of all positions regardless of size and direction. However, CCPs may incur costs beyond this level during the default management phase if the transactions needed for liquidation or hedging generate an additional adverse market impact on price.

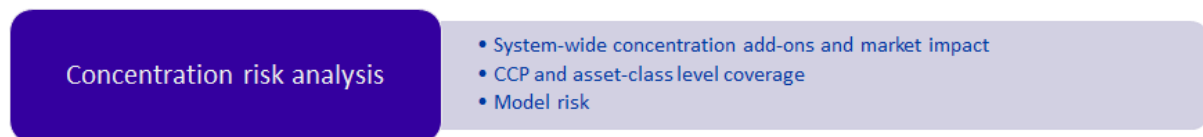


FIGURE: ELEMENTS OF CONCENTRATION RISK

How do the credit and concentration component interact?

The credit component uses the CCPs' own Profits and Losses (PnL) calculation based on the common market stress scenario, while the concentration PnL is calculated by ESMA staff in line with the methodology for this exercise. The combined impact of the 2 components has been computed on one date reflecting the account structure. For the reverse stress analysis, the process was repeated with both market and concentration PnL reflecting the corresponding more extreme assumptions.

What is liquidity risk in this context?

Liquidity risk is the risk that a CCP may have insufficient liquid funds to meet its payment obligations in a timely manner when these become due over a relevant time horizon. It can arise due to unexpected liquidity needs and/or absence of sufficient liquidity resources. The liquidity stress test assesses the resilience of CCPs to market-wide and idiosyncratic liquidity stress events. It captures the systemic dimension of liquidity risk, in addition to the analysis of resilience of individual CCPs, and enables ESMA to identify potential shortcomings and issue recommendations to address those.

In this exercise, ESMA tested not only the default of the top 2 groups of clearing members of the CCPs, but also introduced a reverse stress test by increasing stressed flows up to x2, and assessed liquidity requirements stemming from the temporary unavailability of interoperable CCPs.

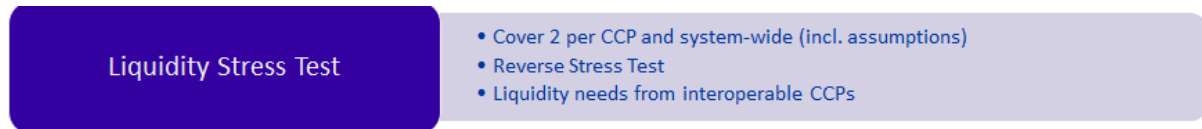


FIGURE: ELEMENTS OF LIQUIDITY RISK

What is climate risk in this context?

The climate risk analysis is a new exercise to explore such risks and their potential impact on CCPs. As outlined in the February 2022 call for evidence by ESMA on climate risk stress testing for CCPs², the impact of climate risk for centrally cleared derivative markets may manifest itself along various lines. ESMA focused its analysis on four key climate-related risks transmission channels: (i) impact of transition risk on business model risk, (ii) impact of transition risk on collateral requirement, (iii) impact of physical risk on CCPs' operations, and (iv) impact of physical risk on markets. This analysis differs from a regular stress test since it does not aim at providing any quantitative impact on CCPs but to gain an understanding of and raise awareness on climate risks and potential associated vulnerabilities. This analysis is still at an early stage of development and will improve along the availability of adequate and reliable data. It should therefore be understood as a yardstick for further action regarding climate risks' monitoring.



FIGURE: ELEMENTS OF CLIMATE RISK

How does the clearing ecosystem analysis look like?

² https://www.esma.europa.eu/sites/default/files/library/esma91-372-1785_call_for_evidence_on_ccp_climate_stress_tests.pdf

The ecosystem analysis provided further insights into the clearing landscape, especially on collected financial resources, how they were invested by CCPs, and linkages between and behaviours of CCPs and other market participants in various markets, such as large clients active through multiple clearing members or CCPs.

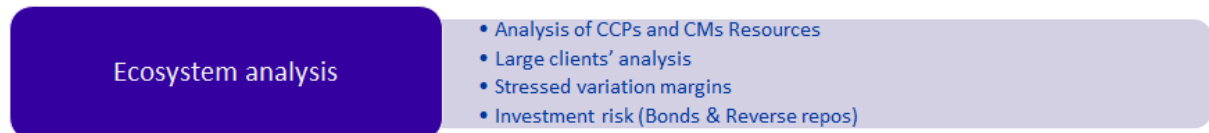


FIGURE: ELEMENTS OF ECOSYSTEM ANALYSIS

The analysis of CCPs and clearing members' resources presents financial resources collected by CCPs for different purposes, including margins and default fund amounts, and compares them with the previous stress test exercise. One finding is that the amount of resources has increased significantly compared to the previous exercise. In particular, the total amount of required margin increased from 392bn EUR in March 2021 to 612bn EUR in March 2023 (+56%). The relatively high increase can probably be attributed to the stress events in recent years and resulting episodes of volatility surge. The increase contributes further to the systemic importance of the central clearing system as a whole. The amount of default fund contributions shows a lower increase. The top nine clearing member groups provided each more than 20bn EUR required margin, which accounts on aggregate for 59% of the total required margin. Comparison with data reported at previous exercises indicates that there is no further notable increase in the concentration of resources provided by the top clearing member groups, but rather a more generalized increase of margin for all clearing members.

The analysis into large clients of multiple clearing members and CCPs, using derivative exposures reported from EU counterparties to Trade Repositories under the EMIR reporting obligation, contributed to a further understanding of client concentrations in the central clearing ecosystem of the EU. The analysis starts by reconstructing for specific asset classes, namely equity, power, gas and European Union emission allowances (EUA) derivatives, a network view of the clearing ecosystem and estimating a numerical score of the importance of each node. With the exemption of equity derivatives, there is typically a small number of clearing members playing a dominant role in the considered markets, while in many cases the same clients are normally active in both energy (gas and power) and EUA derivatives.

On the analysis of variation margins in stress conditions: ESMA found that 90% or more of these flows were concentrated in the top three CCPs and were denominated in EUR, USD and

GBP. The distribution of stressed variation margins between client and house accounts significantly varies across CCPs. Financial institutions in the EU, US and UK were exposed to most of stressed variation margins. The top clearing member groups are large financial institutions, and based on their size, it would be reasonable to expect that the net reported flows could be well covered by their high-quality liquidity asset (HQLA) holdings.

The last analysis concerned the impact of CCPs' investments of cash resources in the various markets. On CCPs' investments in bonds, ESMA found, using code developed in collaboration with IMF staff, that market risk stemming from the liquidation of bond portfolios in stressed market conditions seems limited. However, for repos ESMA noted that haircuts applied to reverse repos are small overall and smaller than the haircuts applied to CCP collateral, which could expose CCPs to counterparty credit risk, should they need to liquidate repo collateral of failing counterparties under stressed market conditions to retrieve cash.

Is stress testing part of CCPs risk management?

Yes. CCPs are required to conduct daily stress tests as part of their on-going risk management.

What is the difference between a CCP stress test and the one ESMA conducted?

CCP stress tests mostly focus on the specific CCP and its market environment. CCPs are however inter-connected through common clearing members. Thus, a default of one of the top clearing members in one CCP could trigger a simultaneous default of one or more entities in other CCPs. Individual stress tests run by CCPs cannot reveal any systemic implications because of their reduced scope. Therefore, the system-wide stress test is a very useful tool in assessing the resilience of the system of CCPs.

Is the exercise assessing the compliance of CCPs with regulatory requirements?

As with previous exercises, the objective of the ESMA stress test exercise is to assess the resilience of CCPs to adverse market developments. This exercise is not aimed at assessing the compliance of the CCPs with regulatory requirements, nor at identifying any potential deficiency of the stress testing methodology of individual CCPs. Despite the fact that it is not aimed to do so, it may expose individual shortcomings, in which case ESMA will issue the necessary recommendations.

What are the different levels of protection a CCP has in place?

CCPs have rules, arrangements and resources to ensure that they can respond, in an orderly and efficient way, to a defaulting member. For example, a CCP may seek to find new counterparties to take on the positions of the defaulting member and bring the CCP back to a matched book of contracts. This is sometimes achieved through an ‘auction’ of the defaulter’s position among surviving members.

In terms of resources to cover their obligations, CCPs have access to financial resources provided by the defaulting party, the CCP itself and the other, non-defaulting members of the CCP. The order in which these are drawn down helps to create appropriate incentives for all parties (members and CCPs) to manage the risks they take on. These funds are collectively known as the CCP’s ‘default waterfall’ (see figure below).

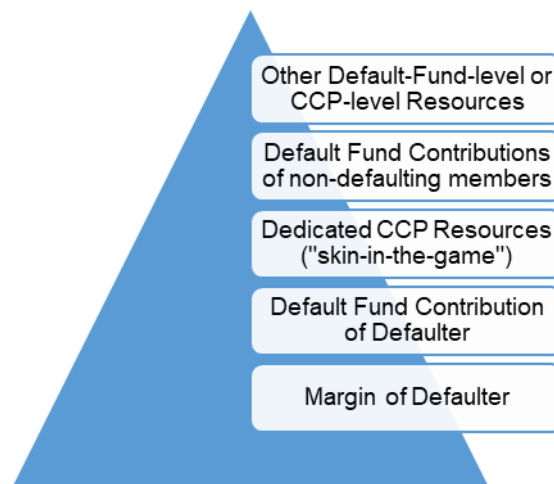


FIGURE: CCP DEFAULT WATERFALL

How do overall results look like?

EU and Tier 2 CCPs proved to be overall resilient towards the different types of risks and under the considered scenarios and assumptions. The overall high level of collateral that was collected by CCPs during the reference period may have contributed to the positive results.

In addition to the ESRB market scenario, the introduction of additional scenarios identified on the basis of CCPs’ activity for the credit risk component, as well as the extension of reverse stress testing to concentration and liquidity risks added to the robustness of the exercise.

The additional scenarios confirm that CCPs are resilient against an extended set of market stress and correlation breakdown assumptions. The reverse credit stress test indicates a resilient clearing system for which substantial additional stress in terms of market shocks, number of defaulting member groups or concentration costs is needed to go beyond CCPs' lines of defence.

The concentration risk analysis found that liquidation costs for large positions can significantly contribute to losses from credit risk. Some gaps persist in the coverage of this risk across CCPs and asset classes, notably for commodity derivative positions. The analysis identified some modelling assumptions that are likely to be a major factor in these gaps, such as the recognition of benefits from offsets across products during the liquidation phase.

The liquidity risk component did not evidence gaps in available liquid resources for CCPs under the applied liquidity stress scenarios. The exercise includes for the first time an assessment of the temporary unavailability of interoperable links and finds under the assumed scenarios that the liquidity risks would be substantial; however, they are sufficiently addressed through available liquid resources. The reverse stress test shows that CCPs clearing securities markets would be most impacted by an increase in stressed flows. Finally, this exercise found that investment activities of CCPs may impact their liquidity profile, for example, through their bond investments and cash lending activities through reverse repos.

The climate risk analysis shows that CCPs' exposures to climate risk depend heavily on the type of markets they clear, especially where directly exposed to transition risk, such as commodity and energy contract clearing. The majority of sampled CCPs have started to integrate climate risk into their stress testing framework, capturing the potential impact of acute physical risks on assets' prices. This exploratory analysis should be understood as a yardstick for further action with regard to climate risks' monitoring.

Are any individual CCP results highlighted by the exercise?

The fifth stress test finds that CCPs are overall resilient, however, some CCPs results are highlighted in the report.

For the credit component, ESMA disclosed results per CCP but did not detect any major systemic risk concerns under ESRB scenario. For the additional scenarios, and given the novelty of the approach, the results are displayed at aggregate level.

For the concentration component, significant gaps remain in the coverage of liquidation costs. The variability of the coverage across CCPs and asset classes indicates divergent approaches in the industry and the potential for model risk. While a majority of CCPs address concentration risk explicitly through charging dedicated margin add-ons, a few CCPs still do not. Other CCPs, while charging concentration add-ons at CCP level, do not do that for all the asset classes where the risk exists.

For the liquidity component, ESMA disclosed results per CCP, showing that CCPs are resilient under the implemented scenarios and tested assumptions. The new reverse stress test is anonymised since it only aims at assessing the resilience of the overall system to larger stressed flows.

As the methodology and assumptions of the climate component were applied for the first time, the climate risk analysis results have been presented on an anonymous basis.

What are the planned next steps?

In line with the EMIR mandate, where the assessments expose shortcomings in the resilience of one or more CCPs, ESMA will issue as a next step the necessary recommendations. ESMA is currently considering whether any recommendation is needed and what form it should take.