



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

The European Securities and Markets Authority (ESMA) has published today the results of its fourth 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 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 15 CCPs, including all authorised EU CCPs as of June 2021 and the two third-country Tier 2 CCPs. Namely, these are:

CCP	
ATHX	Athens Exchange Clearing House
BME	BME Clearing
CCG	Cassa di Compensazione e Garanzia S.p.A.
CCPA	CCP Austria Abwicklungsstelle für Börsengeschäfte GmbH
ECC	European Commodity Clearing
ECAG	Eurex Clearing AG
EUROCCP	European Central Counterparty N.V.
ICEEU	ICE Clear Europe
ICENL	ICE Clear Netherlands B.V.
KDPW	KDPW_CCP
KELER	Keler CCP
LCHSA	LCH.Clearnet SA
LCHUK	LCH.Clearnet Ltd
NASDAQ	Nasdaq OMX Clearing AB
OMI	OMIClear – C.C., S.A.



Who uses CCPs?

The CCPs included in the exercise have collectively close to 750 Clearing Members (CMs), which can also include multiple entities belonging to one group structure. CCPs are mostly used by financial counterparties such as banks and investment firms.

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

CCPs are connected to financial firms and the markets, both locally and globally, which makes them exposed to and a potential source of systemic risk. Given the systemic importance of CCPs, assessing their resilience is important to ensure sound and safe market infrastructures. 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 tests in general 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 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 fourth CCP stress test executed by ESMA.

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

ESMA ran the exercise in different stages in 2021, assessing the actual exposures of CCPs using data provided by the CCPs for two reference dates in March 2021 and April 2021. Following the definition of the [framework](#)¹ for conducting the exercise, CCPs provided in Q3 2021 the data for the stress test. National Competent Authorities (NCAs) initially and then ESMA validated the data before calculating the different stress scenarios.

¹ <https://www.esma.europa.eu/file/119720/download?token=PtWBdAbz>

What exactly did ESMA test?

ESMA tested the resilience of 15 CCPs by exposing them to adverse market conditions. ESMA's stress test covered the *counterparty credit risk*, which CCPs may face because of multiple CMs defaults and simultaneous market price shocks, the *concentration risk*, which assesses the additional cost of liquidating concentrated positions in a short period of time and for the first time the operational risk which assesses the resilience of CCPs to events disrupting their activity.

The stress test exercise has the following four components:

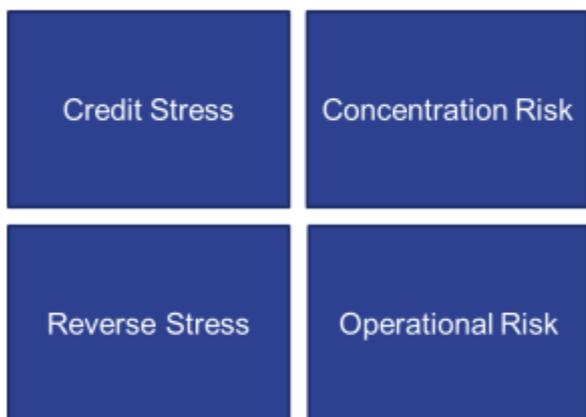


FIGURE: COMPONENTS OF THE STRESS TEST EXERCISE

- **Credit Stress:** Assess the sufficiency of CCPs' resources to absorb losses under a combination of market price shocks and CM default scenarios.
- **Concentration risk:** Assess the impact of liquidation costs derived from concentrated positions
- **Operational risk:** Analyse operational resilience with a focus on external operational dependencies that are needed by CCPs to provide their critical services.
- **Reverse Credit Stress:** Increase the number of defaulting entities and level of shocks to identify at which point resources are exhausted.

Clearing member default scenarios

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

- The default of the two groups of CMs system-wide with the largest aggregate exposures to all in-scope CCPs (**All CCP cover-2**), which is designed to collectively test the resilience of CCPs as a system of financial infrastructures.
- The default of the top-2 groups of CMs 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 one common market stress scenario. Similarly to the third exercise, the stress results are not based on the CCPs' own scenarios. The stress results are based on a pre-defined and internally consistent market stress scenario provided by ESRB for the purpose of this exercise. The scenario is common across all CCPs and is used for credit stress tests.

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

From a credit risk perspective, a combination of CM defaults and simultaneous severe shifts of risk factor prices is needed to put a CCP at risk. If CMs 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 CMs without simultaneous adverse market shocks should not put a CCP at risk. CMs post margins and provide default fund contributions which taken together provide a very high confidence level. This should make sure that CCPs have sufficient resources to manage a default of a CM 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 credit risk perspective and with the exception of investment risks, only simultaneous defaults and extreme, adverse shifts of market prices could pose potential 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 CMs and are therefore exposed to risks arising from the default of one, or multiple, of its counterparties.

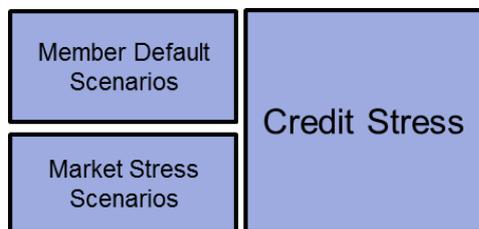


FIGURE: ELEMENTS OF COUNTER-PARTY CREDIT RISK

Is counterparty credit risk the only risk that CCPs face?

No. CCPs are also subject to other types of risks, such as liquidity, investment (credit & market) and operational risks that could in isolation, or combined with counterparty credit risk, challenge their resilience.

Liquidity risk was covered in the past two stress test exercises and has been paused for this exercise due to the absence of identified risk in the previous exercise and resources constraints.

What is concentration risk in this context?

For the purpose of this exercise, the market illiquidity (or concentration) risk is the added cost of liquidating in the market a position (or hedging it) in a short amount of time (in practice the time allocated to the management of a default by a CCP).

As part of the credit stress scenario, initial market shocks apply to the mid-price of all positions regardless of their size and direction. However, it is likely that CCPs would incur costs beyond this price, depending on the size of their positions and the depth of their markets.

In the context of a portfolio containing a single asset, e.g. an equity, the concept is quite straightforward. There is only so much the market can absorb in one day before the market price of the security moves in an adverse direction.

What is operational risk in this context?

The Principles for Financial Market Infrastructures (PFMI) define operational risk as: *The risk that deficiencies in information systems or internal processes, human errors, management failures, or disruptions from external events will result in the reduction, deterioration, or breakdown of services provided by an FMI.*



In this first exercise, specific focus has been put on operational risk from critical third-party service providers, using a hypothetical scenario involving the outage of a critical third-party service provider.

How was the operational risk modelled?

The operational risk analysis is comprised of three parts:

1. Assessment of the general level of operational resilience of individual CCPs: using data of past events, ESMA staff developed metrics to evaluate and compare the past operational performance of individual CCPs' internal critical systems and critical supporting functions and derive insights on their level of operational resilience.
2. Assessment of risk exposures of individual CCPs to critical third-party providers: using data of critical providers, risks related to each critical provider and available protective tools ESMA staff developed metrics to evaluate and compare the exposure of individual CCPs to third-party risk and their resilience to a hypothetical unavailability scenario.
3. Assessment of concentration or systemic risks in the network of critical third-party providers: using data of critical providers, risks related to each critical provider and available protective tools ESMA staff analysed the interconnections between individual third-party providers and multiple CCPs that could lead to correlated operational risk events across entities.

How do the credit and concentration component interact?

The credit component uses the CCPs' own PNL calculation based on the common market stress scenario, while the concentration PNL is run by ESMA staff. For this new exercise, the combined impact of the 2 components has been computed on one date using account structure data and running the waterfall in full.

How does the scenario of this exercise relate to the market stress following Russia's invasion of Ukraine?

During the finalisation of the exercise, Russia's invasion of Ukraine led to extreme market movements for instruments across the commodities and energy markets. An analysis of the stress scenarios in the light of these market moves is presented in the report. The comparison of the scenario shocks with the maximum market moves during the first days of the war showed that the

ESRB scenario is overall of greater or comparable severity for most asset classes, but of a lesser severity for some commodities, mainly in the EU energy space. Moreover, different directions of shocks were observed in some cases, mostly in the commodities asset class. The divergences highlighted can be explained by the scenario design, that was modelled based on the sources of systemic risk to the EU's financial system that have been identified by the ESRB. More specifically, it was built around ongoing concerns at the time of the design about the evolution of the COVID-19 pandemic and its economic ramifications. The ESRB stress test scenarios typically model an economic downturn which is very different from shocks driven by supply concerns experienced during the invasion. The stress test cannot be used to assess resilience under specific historic events, but rather aims to assess the resilience of CCPs on a forward-looking basis and under a specific potential future scenario.

ESMA, in coordination with national competent authorities, closely monitored the impact that the outbreak has had on CCPs. The analysis performed by ESMA confirmed that the CCPs active in commodities clearing were the most exposed, in particular the ones with relevant positions in power and to a lesser extent gas products. Moreover, the CCPs with a more diversified set of cleared products were not significantly affected primarily because of the lower experienced volatility in prices of other commodity and financial products. Overall, ESMA notes that CCPs remained resilient through the crisis, despite the increased market volatility.

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 CMs. Thus, a default of one of the top CMs 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 an extremely 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 might 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 its 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).

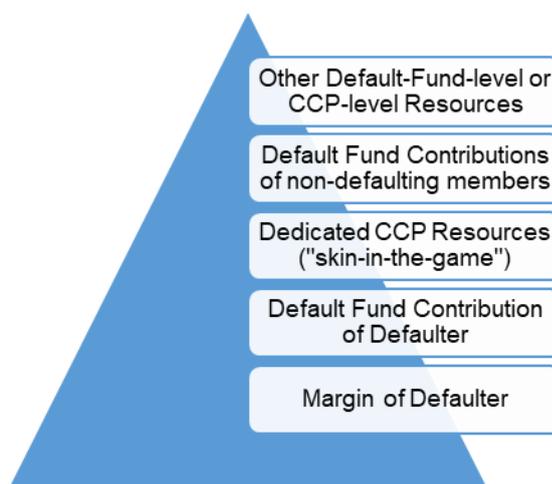


FIGURE: CCP DEFAULT WATERFALL

How does this look like for the CCPs tested?

CCPs provided for the purpose of this exercise detailed data on their financial resources for both reference dates (March and April 2021). The CCPs reported in total approximately 423 billion EUR of required margin, default fund contributions and other committed prefunded resources for March and 409bn EUR for April. The amount of mutualised resources alone contributed by clearing

members to the Default Funds of all CCPs in March was 30.5 bn EUR for March and 31.7bn EUR for April.

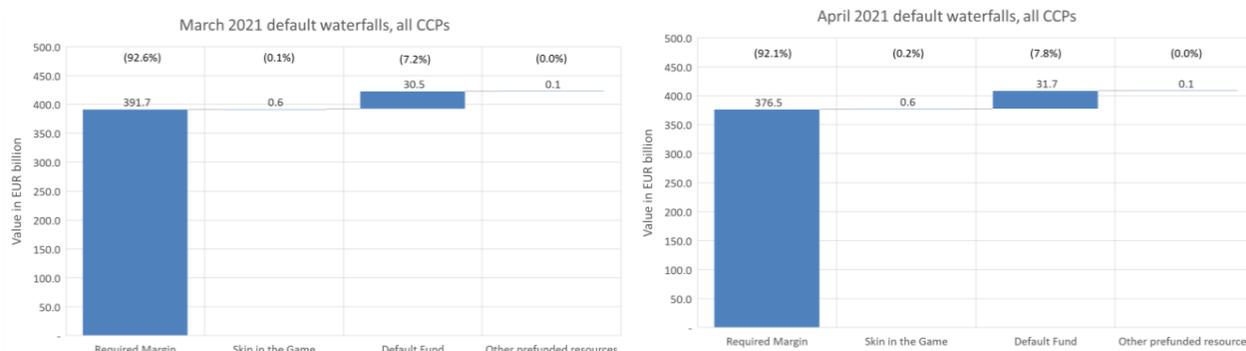


FIGURE: DEFAULT WATERFALL AMOUNTS – ALL CCPs

How do overall results look like?

In this exercise, the counterparty credit risk stress test was performed through the application of a single hypothetical scenario to two different dates (March and April 2021) and the inclusion of concentration costs and wrong-way risk losses on March date, while operational risk and concentration were tested only for one date (March 2021). Overall, the results show that the analysed network of CCPs is resilient to common shocks and multiple defaults.

For the credit component, under the Cover-2 per CCP credit stress test scenario, ESMA assesses the resilience of each CCP to the default of its top-2 clearing members groups under common price shocks. The prefunded resources were sufficient to cover the losses resulting from the core credit stress test scenarios with relatively low or moderate % consumptions. The sensitivity analysis also indicated that the conclusions seem robust to small changes in the baseline shocks. The impact due to concentration and specific wrong-way risk stemming from cleared positions led to higher losses and consumption for almost all CCPs but under the considered market scenario these were contained within the default waterfalls of the CCPs and there was no shortfall of prefunded resources.

Under the All-CCPs Cover-2 stress test scenario which is designed to assess the resilience of CCPs collectively, the majority of CCPs would experience a default of at least one of their clearing members. However, these consistent scenarios did not put significant stress to any CCP with the % consumption of default fund-level prefunded resources being relatively low in all cases. This indicates that while CCPs are highly interconnected through common clearing participants, the



exercise did not highlight any pairs of groups that are at the same time and under the common tested scenario highly impactful at multiple CCPs.

For the concentration component, this second system-wide analysis shows that concentrated positions represent under our model a significant risk for both EU and Tier 2 CCPs. In absolute terms, fixed income derivatives have the most concentration risk, with a total over 29bn EUR. Bonds (including bonds from Repo clearing services) come next with a total concentration risk modelled to be around 11 bn EUR.

Concentration in commodity derivatives and in the equity segment (securities and derivatives) is very significant as well, with around 7bn EUR of concentration risk modelled for each asset class. There is a very large coverage gap between the system-wide estimated market impact and margin add-ons, for commodity derivatives and to a lesser extent for equity products. The estimated concentration risk for Emission Allowances stands also out at 2.5bn EUR and is not adequately covered.

Based on the operational risk analysis, ESMA identified varying degrees of operational reliability for the CCPs included in the exercise and identified specific CCPs where further work should be conducted to understand the drivers of these differences, the root causes of the events and the remediation actions taken. Through the use of the hypothetical scenario involving the outage of a critical third-party service provider, ESMA evaluated the exposure of CCPs to critical third-party service providers and the ability of CCPs to reduce risk through operational risk management tools. Using exposure indicators, differences across CCPs in their relative level of third-party risk were identified. Further work should be conducted to evaluate the individual circumstances of these exposures and the suitability of taking corrective action to improve operational resilience against operational shocks affecting critical third-party service providers. In the analysis of the network of critical third-party providers, ESMA aggregated the information provided by individual CCPs in order to understand and assess risks from common exposures to third-party risk that could be sources of systemic risk. Through this analysis, ESMA identified the critical third-party service providers with highest systemic importance for the CCP sector based on both the criticality of their services and their level of interconnectedness with CCPs.

Are any individual CCP results highlighted by the exercise?

The fourth stress test finds that CCPs are overall resilient, however, some CCP 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 the tested scenario.

For the two main CCPs clearing commodities (ICEEU and ECC), the baseline model concentration risk per our calculation is 7 to 10 times greater than the concentration add-ons. The gaps representing around 17% of required margin are 778m EUR for ECC and 5.6 bn EUR for ICEEU. We note that despite the significant differences, stress losses adjusted for modelled concentration costs for both CCPs were contained within their respective default waterfalls and did not lead to any shortfall of prefunded resources.

The concentration risk is factored in explicitly in a majority of CCPs through dedicated margin add-ons. Although all CCPs have market impact risk, four CCPs (KDPW, CCP.A, KELER, CCG) did not report any concentration add-ons. Since the data request date, KDPW and CCG have implemented or are in the process of introducing concentration add-ons. KELER relies on a monitoring system to require additional collateral in case of elevated concentration.

As the methodology and assumptions of the operational component were applied for the first time, the operational 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.