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Framework for Estimating Financial Needs in the Resolution of Central Counterparties

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A methodological approach to the development of Step 3 of the FSB's Guidance on financial resources and treatment of CCP equity in resolution

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Acronyms used

CCP	Central counterparty
DL	Loss due to default (losses resulting from the default of one or more clearing members)
ESMA	European Securities Market Authority
EU	European Union
FSB	Financial Stability Board
NCWOL	No Creditor Worse Off than in Liquidation (principle of legal safeguard)
NDL	Non-default losses (losses not arising from the default of a clearing member, e.g., operational failure or cyberattack)
Second SITG	Second tranche of CCP contributions.
SITG	CCP’s financial contribution to the default cascade
SRF	Single Resolution Fund

Abstract

This paper presents a methodological framework for estimating the potential costs associated with the resolution of central counterparties (CCPs), in line with Step 3 of the *Guidance on Financial Resources to Support CCP Resolution and on the Treatment of CCP Equity in Resolution* issued by the Financial Stability Board (FSB) (FSB, 2024b). It distinguishes between losses to be absorbed under different resolution scenarios – whether due to default (DL) or non-default (NDL) events – and additional costs arising from the execution of the resolution process.

Different methodological approaches are proposed for quantifying each cost category during the resolution planning phase, including the use of actual portfolios, hypothetical data, reverse stress testing, market benchmarks, internal simulations, budgetary analysis, and legal criteria. Additionally, cost-sharing and cost-recovery mechanisms are addressed, and the No Creditor Worse Off than in Liquidation (NCWOL) principle is analysed due to its legal and financial relevance.

The paper concludes with proposals aimed at strengthening robustness, comparability, and practical applicability of cost estimations, with particular attention to NDL scenarios, internal model validation, and international harmonisation. Finally, it invites a strategic reflection on the potential convergence between bank resolution frameworks and those applicable to financial market infrastructures, in support of financial stability.

Keywords

CCP resolution, default losses (DL), non-default losses (NDL), common costs, NCWOL, cost estimation, resolution funding, financial stability.

1 Introduction

The ability to resolve central counterparties (CCPs) is an essential component of the financial stability framework. In this context, the resolution planning phase aims to prepare in advance for a potential intervention, ensuring that, in the event of a crisis, an effective resolution strategy can be implemented. Such a strategy should preserve the continuity of critical functions, minimize the impact on market participants, maintain financial stability, and avoid the need for public financial support.[1] In line with this approach, the Financial Stability Board (FSB) (FSB, 2017) set out the core principles for the design and implementation of resolution plans, emphasizing the need to assess available resources, define feasible tools, and consider the systemic, legal, and operational implications of each measure.[2]

Since then, the development of methodologies to quantify potential resolution costs has gained particular relevance, as it enables the assessment of the adequacy of available resources and the anticipation of the financial impact of different scenarios during the resolution planning phase.

This document forms part of this workstream and aims to classify resolution costs by their origin, propose methodological approaches for their estimation, and contribute to identifying potential areas for improvement in the resolution planning of CCPs.

In particular, this document aims to set out possible methodologies in relation to the development of Step 3 of the *Guidance on Financial Resources to Support CCP Resolution and on the Treatment of CCP Equity in Resolution* (FSB, 2024b), concerning

1 The Financial Stability Board's *Key Attributes of Effective Resolution Regimes for Financial Institutions* (FSB, 2024c) was initially approved in October 2011 as an international framework for the resolution of systemic financial institutions. In 2014 it was updated to extend its application to financial market infrastructures, including systemic CCPs. The most recent revision, published in April 2024, reinforces the principles regarding the financial resources and resolution tools available to CCP resolution authorities. The FSB Key Attributes (FSB, 2024c) have been incorporated into the regulatory framework of the European Union through Regulation (EU) 2021/23, which establishes the recovery and resolution regime applicable to CCPs.

2 For a detailed analysis of the international approach to the financial resources required for CCP resolution, see the FSB report (2024a) which develops a strategy based on a set of tools available to resolution authorities that allows them to have diversified instruments adapted to different objectives (loss absorption, recapitalisation, liquidity provision) while reinforcing the principles set out in the Key Attributes (FSB, 2024c). This framework is complemented by the analysis of Gómez Yubero (2022), who examines the resolution instruments provided for in Regulation (EU) 2021/23 from a critical perspective, highlighting the practical difficulties of their implementation and the risks of systemic impact, especially when there is a strong dependence between the CCP and its participants or insufficient legal and contractual provision for resolution measures.

the estimation of the potential resolution costs of a CCP.[3] The analysis has been based mainly on the evaluations and analyses collected in the report *Central Counterparty Financial Resources for Recovery and Resolution* (FSB, 2022) which uses a common methodology to evaluate loss scenarios, and has been enriched with reflections and some exploratory work developed by the authors.

The purpose of this document is to contribute to the international debate by providing a concrete perspective on possible methodological approaches for cost quantification in resolution planning, as well as to identify areas that may require further regulatory or technical development.

The document is structured into several thematic sections. First, the typology of resolution costs is presented, establishing a conceptual basis on what is meant by resolution costs and how these costs are classified. The practical methodology for estimating them is then presented, differentiating between scenarios of default loss (DL), non-default loss (NDL) and common costs. Subsequently, the legal and operational implications of the principle "No Creditor Worse Off than in Liquidation" (NCWOL), included in the European regulatory framework, are addressed. Finally, aspects are included that, in the opinion of the authors, could benefit from further clarification, exploration or reflection in the future.

In this context, it is particularly relevant to conceptually differentiate the losses arising from the crisis scenarios (DL and NDL), which reflect the direct economic impact on the CCP, from the resolution costs themselves, understood as the resources necessary to execute the resolution strategy in an orderly manner, beyond the initial financial losses. This methodological distinction, set out in Step 3 of the *Guidance on Financial Resources to Support CCP Resolution* (FSB, 2024b), guides the structure of the analysis presented in this document. However, for the sake of simplification of the discussion, the term "resolution costs" may be used throughout the text in a broad sense, encompassing both losses and resolution costs in the strict sense.

3 To contextualise the principles of cost allocation and the defence structure of CCPs, see the article by Gómez Yubero & Gullón Ojesto (2020) which analyses the regulatory and operational framework for the resolution of CCPs and sets out the FSB (2024b) Guidance on financial resources and treatment of equity in resolution.

2 Types of losses and costs in resolution

In line with the terminology used by the FSB (2024b), this document differentiates between:

- **Losses associated with resolution scenarios**, understood as the direct financial impacts resulting from DL or NDL events, which trigger the activation of the resolution mechanism and must be absorbed through the available financial resources.

- **Resolution costs,** defined as the costs of replacing financial resources, as well as the additional and cross-cutting expenses necessary to ensure operational continuity – including operational, technological, legal and administrative expenses – the implementation of resolution tools and compliance with the NCWOL principle, in order to preserve the stability of the system during the process.

This distinction is relevant both for financial planning and for the allocation of responsibilities between the different actors involved.

To facilitate its analysis, two large blocks will be distinguished: on the one hand, the specific losses linked to the different resolution scenarios – DL and NDL –, and on the other hand, the common costs that may arise regardless of the scenario considered.[4]

2.1 Losses according to the resolution scenario

The main characteristics and sources of losses depending on the type of scenario are described below: DL, NDL and mixed or combined scenarios.

In **DL scenarios,** the main source of losses is the bankruptcy or failure of one or more clearing members. These events require the management of the positions affected by the default, the activation of the cascade of financial resources and, if necessary, the use of additional resolution tools to cover losses that exceed the prefunded resources, and the resources eventually provided in the recovery phase.

4 In accordance with EU legislation (Regulation (EU) 2021/23), the decision to take resolution action by a resolution authority, in the event of a CCP being deemed failing or likely to fail (FOLTF), may be based on a provisional valuation. This valuation may be carried out by the resolution authority itself or by an independent valuer and should include a buffer for potential additional losses that the valuer reasonably considers may arise. The resolution authority must have a definitive valuation, prepared by an independent valuer, as soon as possible after the adoption of the resolution decision.

Financial pressures may arise both in matched book[5] situations, where the CCP is required to close out positions through offsetting transactions, and in unmatched book scenarios, characterised by difficulties in hedging positions, the potential absence of counterparties, and the occurrence of adverse price movements or significant market dysfunctions. In both cases, losses may exceed initial estimates, particularly in the event of collateral deterioration or a liquidity crisis that hampers the orderly management of position close-outs.

In **NDL scenarios,** losses can be generated from non-financial risks, such as cyber incidents, operational failures, or loss of access to assets in custody. These events directly affect the CCP's own assets or functional capacity, generating significant disruptions, high continuity costs and reputational or legal impacts.

There are also **mixed or combined** scenarios in which both DL and NDL elements coexist. In such cases, financial losses are compounded by operational and administrative expenses, increasing the complexity of the resolution process and potentially requiring the simultaneous activation of multiple resolution tools.

Table 1 schematically summarises the main sources of losses associated with each type of scenario.

Associated losses according to the type of resolution scenario TABLE 1

Scenario	Origin of losses	Description of associated losses
DL scenario	Default of one or more clearing members	Financial losses arising from the process of closing the defaulting member's positions. These losses may occur when the available resources (such as collateral provided by the member or the CCP's guarantee fund) are not sufficient to cover the impact of the closure. In addition, if it is not possible to match positions with counterparties (unmatched ledgers), additional losses may arise from adverse movements in market prices, lack of liquidity, or difficulty in finding new counterparties.
NDL scenario	Materialisation of non-financial risks (operational failures, cyber incidents, loss of access to assets)	Financial losses resulting from interruptions in critical functions, extraordinary costs of recovery, replacement of services or access to assets, as well as possible sanctions, legal claims or reputational deterioration.
Mixed scenario	Simultaneous combination of DL and NDL events	Accumulation of losses of different nature: financial (due to non-compliance), operational (due to functional disruptions), administrative and legal. It increases the complexity of the resolution process and may require simultaneous activation of multiple tools.

Source: Authors' own work.

5 A "matched book" in a CCP refers to the situation where all long positions are offset by equivalent short positions, so that the CCP does not assume its own market risk, only counterparty risk.

2.2 Costs common to all scenarios

In addition to the **specific losses associated with the different scenario**s, the execution of an orderly resolution involves incurring **additional costs**, which we call "resolution costs in the strict sense". These elements are cross-cutting to any type of event and must be systematically considered in planning.

One of the most relevant aspects, although it is not strictly an operational cost, is the **replacement of the financial resources** used during resolution. This need concerns, firstly, the capital of the CCP, which will have to be restored if it has been fully or partially absorbed during the process. It also involves the reconstruction of the default fund and the CCP's own contributions, such as skin-in-the-game (SITG) and second skin-in-the-game (second SITG), when established by the regulatory or contractual framework. Although it is not considered an expense in the strict sense, this replenishment is essential for the entity to resume its operations safely, comply with regulatory requirements and maintain the confidence of its participants. Therefore, it must be explicitly addressed in the planning of the resolution.

Secondly, there are **costs associated with the implementation of resolution tools**, which may include operational outlays linked to the application of measures such as cash calls, variation margin gains haircutting, liability conversions, portfolio transfers, or the sale of all or part of the CCP's business, among others.

Thirdly, the possible **cost of obtaining alternative financing** must be considered, which makes it necessary to provide in resolution plans for the necessary mechanisms to access financial resources in situations where the ordinary cascade of resources available for resolution has been exhausted and there are additional needs to implement the resolution strategy. Associated costs may include required warranties, availability fees, contractual penalties, or access conditions in tense market scenarios. Although these mechanisms do not constitute a source of structural funding, their activation in a stress situation can be critical to ensure the continuity of critical functions and should therefore be assessed and quantified in resolution plans.

Another key block is the **operational continuity costs**, which are necessary to ensure that the critical functions of the CCP remain active throughout the process. This may involve retaining essential personnel, providing uninterrupted technology services, maintaining strategic suppliers and, where appropriate, entering into temporary agreements or contractual reviews to ensure such continuity.

Extraordinary management costs must also be considered, arising from the urgent procurement of administrative services – such as the involvement of a notary public in a sale process, as well as technological or logistical support, or from the need to implement ad hoc solutions in response to operational stress or reputational damage. This category also includes expenses associated with the possible appointment, by the resolution authority, of one or more special administrators to replace the Board of Directors of the CCP under resolution, in cases where it is necessary to ensure proper governance and the effective implementation of resolution measures.

There are also the **administrative costs directly associated with the resolution authority**, such as the contracting of independent valuations, specialised technical, legal or strategic advice, documentation and archiving tasks, and coordination activities with other competent authorities or with relevant market participants.

Finally, consideration should be given to the potential **cost associated with the NCWOL principle**, which states that no creditor can be treated worse as a result of the resolution process than it would have been in an ordinary liquidation scenario under the applicable insolvency proceedings, following the full implementation of contractual obligations, as well as the CCP's rules and procedures for the allocation of losses. To ensure compliance with this principle, the resolution authority may be required to compensate creditors who demonstrate that they have incurred a loss greater than they would have suffered in the absence of resolution. This potential compensation must be taken into account in the financial planning of the resolution, although its quantification will depend on independent ex post valuations and the specific characteristics of the case.

Table 2 schematically shows the main costs common to any resolution scenario.

Costs common to all resolution scenarios TABLE 2

Cost category	Description
Replenishment of financial resources	Replacement of the equity absorbed during resolution, reconstruction of the default fund and of the SITG and the second SITG, as provided for in the regulations or in the contractual agreements.
Running resolution tools	Costs arising from the practical application of instruments such as cash calls, variation margin gains haircutting, write-downs or portfolio transfers. They include technology expenses, legal advice, notification processes and operational monitoring.
Alternative financing	Costs associated with the activation of external financing mechanisms, such as commissions, interest rate or additional margin, guarantees or contractual penalties in stress scenarios.
Operational continuity	Resources needed to keep critical functions active during the resolution process, including key personnel, technology systems, and essential vendors. It may require temporary reinforcements or contractual revisions.
Extraordinary management	Expenses associated with urgent measures such as the procurement of administrative, technological or logistical services, as well as the possible appointment of one or more special administrators by the resolution authority to replace the CCP's management body.
Linked to the resolution authority	Fees linked to independent valuations, specialised technical advice, coordination with other competent authorities and document management of the process.
NCWOL compensation	Estimation of the potential cost associated with the NCWOL principle, calculated as the difference between the amount received in resolution and the hypothetical value in the event of ordinary liquidation, after the full application of contractual obligations and CCP rules.

Source: Authors' own work.

3 Methodological approach to estimating losses and resolution costs

Proper estimation of resolution losses and costs is an essential component in resolution planning, as it allows assessing whether the available resources are sufficient to deal with different types of crises and designing effective resolution strategies. This section presents the main methodological approaches identified to quantify these costs, taking into account both the type of scenario and the analytical capacities available in each resolution authority.

In order to structure the analysis, three blocks are distinguished: first, the losses associated with DL scenarios; secondly, losses in NDL scenarios and, finally, the common costs expected to be present in any resolution process, regardless of the event that triggered it. For each block, the starting assumptions are described, as well as the main technical difficulties in estimating them, and the sources of information that may be useful to advance in their quantification.

3.1 Estimation of losses in default scenarios (DL)

One of the methodological options for estimating losses associated with default scenarios is the one proposed by the FSB (2022), which can be complemented with internal tools developed by each resolution authority. This approach is based on real portfolios provided by the CCP, on which severe historical shocks are applied, adjusted by a scale factor of 1.4 per product class. In addition, the simultaneous bankruptcy of the four members with the highest exposure is assumed, which allows a reasonably conservative estimate of the market losses associated with the scenario to be obtained.

As alternatives or complementary elements, methodologies based on reverse stress tests can be used, which allow the identification of combinations of defaults and market conditions that would result in losses exceeding the available resources. In addition, the construction of scenarios with hypothetical data can be useful in contexts where there is insufficient historical information, or when you want to explore the potential impact of structural changes on markets or on the composition of clearing members.

Relevant information can also be provided from the fire drills that the CCPs are obliged to carry out and which usually include the simulation of an auction. At the European level, the CCP Stress Test Exercises coordinated by ESMA offer an additional source of data and analysis on the resilience of infrastructures. On the other hand, at a global level, the Multi-CCP Default Simulation Exercises coordinated by the CCP Global association can constitute another useful tool for the construction of extreme scenarios.

In some cases, resolution authorities have chosen to request loss estimates from the CCP based on predefined parameters. However, there is a growing trend among these authorities to develop internal capabilities for modelling resolution scenarios, using either proprietary or adapted models. This approach strengthens their technical autonomy, enhances analytical capacity, and enables the independent validation of results – an essential element for sound, coherent, and credible resolution planning.

3.2 Estimation of losses in non-default (NDL) scenarios

In this section, we have chosen to focus the analysis on two main events: i) **the loss of access to assets in custody** and ii) **a cyberattack involving the theft of cash**. This selection is justified because they are particularly plausible scenarios in the current operating context of CCPs and because of their ability to reflect, in a representative manner, the risks associated with the different types of non-default losses contemplated in the FSB guidance (2024b). Both events allow us to capture critical elements such as the impact on liquidity, dependence on third parties, exposure to technological and operational risks, and possible legal implications, being therefore sufficiently broad to cover synthetically, but effectively, the specificities inherent in the set of NDL scenarios included in the FSB's methodological framework.

In the first case, the potential loss is estimated by identifying the volume of assets whose loss of access would generate the greatest liquidity risk for the CCP. The FSB's approach proposes to take as a reference the custodian whose fall could lead to an immediate deficit greater than the available liquid resources. To quantify this risk, the peak liquidity exposure is determined during a representative period, including days of extraordinary volatility recorded in the last five years. Cost is calculated as the difference between the immediate liquidity needs and the resources actually available in that scenario.

In the second case, the potential impact of a cyberattack is estimated based on the highest daily value of cash transferred by the CCP to a single depository, either in intraday or end-of-day trading. This amount represents the CCP's maximum effective exposure to a theft event and is used as an initial approximation of the direct impact of the incident.

In practice, many resolution authorities have adopted the FSB methodology for both scenario identification and loss estimation in NDL events. However, it is considered that the most relevant aspect in this type of situation is not so much the absolute value of the losses, but the effective capacity to activate and apply the cascade of financial resources. Since the resources specifically available to absorb such losses are limited, a disturbance of a certain magnitude could trigger an early entry into resolution. Therefore, the focus of the analysis is not only on quantifying the economic impact, but also on understanding when the resolution tools would be activated and how the operational and governance response to this type of event would be articulated.

3.3 Estimation of costs common to all scenarios

In addition to the costs associated with specific scenarios, certain cross-cutting elements must be considered that are expected to be present in any resolution process. These costs, of an operational, financial, legal or administrative nature, are directly linked to the practical execution of the resolution plan, regardless of the event that motivates it.

To facilitate their quantification, methodological guidelines for each of these categories are described below:

- **Replenishment of financial resources:** the estimate may be based on the CCP's accounting data, regulatory capital and equity requirements, and the current amount of the default fund. The analysis should identify the volume needed to restore the minimum capital required, including the CCP's own contributions, such as the SITG and the second SITG, where applicable. The reconstruction of the default fund after its use should also be considered. One of the main challenges is to determine what mechanisms will actually be used to cover this replenishment – for example, whether new cash calls will be used – and what legal or contractual limitations apply to each option.

- **Costs associated with the use of resolution tools:** their estimation can be based on the content of the resolution plan, on the CCP's internal rules – which regulate, for example, cash calls or profit cuts – and on previous experiences, both its own and that of other comparable institutions. Some tools, such as liability conversion or write-downs, are not covered by the CCP's internal rules and can only be applied by the resolution authority, so their cost should be assessed based on external legal and operational criteria.[6] As the design of these tools progresses, a more detailed breakdown of the technological, legal, and operational costs associated with their implementation will be needed. At the moment, there are no standardised estimates for these expenses.

- **Alternative financing costs** to cover deficits once the cascade of pre-financed and committed resources has been exhausted. The estimation of these costs will depend on the type of instrument envisaged (bank or syndicated credit lines, secured financing arrangements, emergency issuance of short-term debt, funds committed by third parties, bilateral agreements, etc.) and the risk profile of the CCP. These costs may include availability fees, margins on funding used, contractual penalties, and the cost of required collateral. Their estimation must be based on the maximum volume of resources needed in severe scenarios and consider different market conditions (normal and stressed). It is advisable to adjust the calculation for the expected duration of use and incorporate market references or real contractual conditions supported by consultations with financial institutions, internal simulations

6 These tools, although necessary, pose significant challenges in terms of their practical effectiveness and potential impacts on financial stability, as Gómez Yubero (2022) has pointed out in her analysis of resolution tools applicable to CCPs.

and analysis of market practices. Although subject to uncertainty, these costs may have a significant impact on the effective implementation of the resolution plan.

- **Operational continuity costs:** these can be estimated from the CCP's monthly or quarterly budget, adjusted based on internal business continuity plans. Contracts with strategic suppliers can serve as a benchmark for calculating the cost of keeping critical functions active for an extended resolution period.

- **Extraordinary management costs:** they can be estimated from the analysis of historical expenditure in crisis situations, internal simulation exercises or external benchmarks. Although these costs have a higher degree of uncertainty, they can be reasonably limited if well-defined and documented stress scenarios are available. This category should include the potential costs associated with the appointment by the resolution authority of one or more special administrators to replace the CCP's management body during the process. The estimation of these costs can be supported by consultations with entities specialised in the hiring of executives or senior managers (headhunters), using reference rates and salary ranges specific to the sector.

- **Administrative costs:** their estimation may be based on market rates for independent valuations, databases of specialised legal services, and records of previous administrative experiences, as well as statutory notarial and registry fees. These costs typically include the documentary burden, inter-institutional coordination, and the technical, strategic, and legal advisory services required during the resolution process.

- **Compensation by the NCWOL principle:** although it is not a cost to be estimated ex ante within the framework of resolution planning, it should be considered as an essential legal element in the design of resolution tools. This guarantee is activated only ex post, if an independent valuation shows that a creditor has received a less favourable economic treatment than it would have obtained in a liquidation scenario. Its legal relevance requires a rigorous assessment of resolution measures and their potential impact on creditors.

The main elements quantified in this section are summarised in Tables 3 and 4.

Methodological approaches to estimating losses by scenario TABLE 3

FSB scenario	Example of estimated loss	FSB's proposed methodology	Other complementary methodologies
DL – Multiple default	Losses arising from the simultaneous bankruptcy of the four most exposed members	Application of severe historical shocks, scaled by a factor of 1.4 on actual portfolios and exposures	Reverse stress tests; scenario construction with what-if data
NDL – Custodian judgment	Value of assets whose loss of access creates an immediate liquidity shortfall	Identification of the most critical custodian and calculation of the impact on liquidity in a representative period	–
NDL – Cyberattack	Maximum volume of cash transferred to a single depository in a single day	Analysis of intraday and end-of-day transfers to determine the maximum level of exposure	Simulation of cyberattacks of different magnitude and duration

Source: Authors' own work based on FSB (2022 and 2024b).

Methodological approaches to estimating common resolution costs TABLE 4

Cost category	Proposed estimation methodology
Replenishment of financial resources	Analysis of the CCP's accounting data, capital and equity regulatory requirements, current default fund amounts, and internal records of waterfall usage. It includes the identification of sources of replacement and the applicable legal or contractual limits.
Running of resolution tools	Evaluation of the CCP's resolution plan and internal rules (for contractual tools). In the case of purely regulatory tools (such as conversions or write-downs), additional legal and operational analysis is required.
Alternative financing	Estimation based on the cost of activating external financing mechanisms: commissions, guarantees required, contractual penalties and market conditions in stress scenarios.
Operational continuity	References to the CCP's monthly or quarterly budget, internal business continuity plans, and current contracts with strategic suppliers.
Extraordinary management	Use of spending history in previous crises, internal simulations and sectoral or international benchmarks.
Administration and coordination	Market rates for independent valuations, databases of specialised legal services and records of administrative experiences in previous processes (legal and strategic advice).
NCWOL compensation	Although it is not accurately estimated ex ante, a preliminary theoretical exercise can be carried out to identify possible impacts, guide the design of resolution tools and anticipate their legal feasibility.

Source: Authors' own work.

4 Considerations on the NCWOL principle

In the analysis of the potential costs associated with resolution, it is essential to incorporate a specific reflection on those that, although not directly quantifiable ex ante, may materialise as a result of the process. Such is the case of the possible set-off derived from the NCWOL principle, the activation of which does not depend on a particular scenario, but on an ex post assessment that compares the treatment received by creditors in resolution with that which they would have obtained in an ordinary liquidation.

This principle introduces a fundamental legal guarantee: no creditor should be in a worse economic situation as a result of a resolution measure it would be in a conventional bankruptcy process. Its purpose is to safeguard the rights of shareholders, non-defaulting clearing members and other creditors, avoiding a less favourable treatment than that provided for by the applicable insolvency framework and following the full application of the CCP's contractual rules.

Failure to comply with the NCWOL principle may entail an obligation on the part of the resolution authority to provide adequate financial compensation. Therefore, its compliance not only has legal implications, but also a potential financial impact that must be expressly considered in resolution planning.

In accordance with EU regulation (Regulation (EU) 2021/23), compliance with this principle requires conducting an independent ex post valuation – known as Valuation III – which compares the actual outcome of the resolution process with the hypothetical treatment that creditors would have received under a liquidation scenario.[7] This valuation must exclude any instruments that are only available within the resolution framework, such as extraordinary liquidity support or loss allocations exceeding those set out in the contractual documentation.

Such a valuation should be carried out by an independent expert, applying criteria that ensure a reasonable estimate of the CCP's outstanding assets, liabilities and contractual relationships. If as a result an economic damage is identified for any creditor, compensation proportional to the damage suffered must be established.

In the specific case of non-defaulting clearing members, compensatory mechanisms can be activated to mitigate losses incurred during the process. These offsets can take different forms, such as ownership instruments, subordinated debt or

7 This valuation should take into account, among other factors, the replacement costs that clearing members would have incurred to reopen comparable net positions in the market, as well as the costs borne by the insolvency administrator. Since these costs are not to be covered with resolution resources, their treatment is not addressed in this document.

economic claims on future profits, depending on the resolution strategy adopted and the contractual terms previously established.

The correct application of the NCWOL principle also has a significant legal dimension. The perception of an unfair or disproportionate treatment may lead to litigation by clearing members or their clients, especially in cases where there are doubts about the legal basis of the measures taken. These risks may be amplified if the resolution tools used are not explicitly provided for in the CCP's internal rules or if they are not recognised by other jurisdictions involved.

For all these reasons, consideration of the NCWOL principle must be incorporated from the initial stages of resolution planning. It represents a key element in ensuring the legal viability of the measures envisaged, reinforcing the legal certainty of the process and mitigating potential tensions with market participants.

5 Assumption of losses and resolution costs and allocation mechanisms

The identification of resolution costs must be accompanied by a reflection on who actually bears those costs, both in economic and legal terms. This issue is essential for assessing the viability of the resolution plan, its legitimacy vis-à-vis market participants and its compatibility with the applicable regulatory framework.

CCP resolution is based on the principle of mutualisation of losses between the CCP and its clearing members (see Figure 1), in accordance with the contractual and resolution instruments provided for and the limits set by each national law. This mutualisation can take the form of the use of the default fund, the CCP's own contributions (SITG), or the activation of tools, such as cash calls or variation margin gains haircutting, among others.

In addition, some operational and administrative costs of the resolution process – such as the hiring of valuers or independent advisers, or legal and technical coordination – are, in principle, borne by the resolution authority itself. Ultimately, however, these costs must be passed on to all the participants involved, either through fee systems or direct charges after the implementation of the plan.

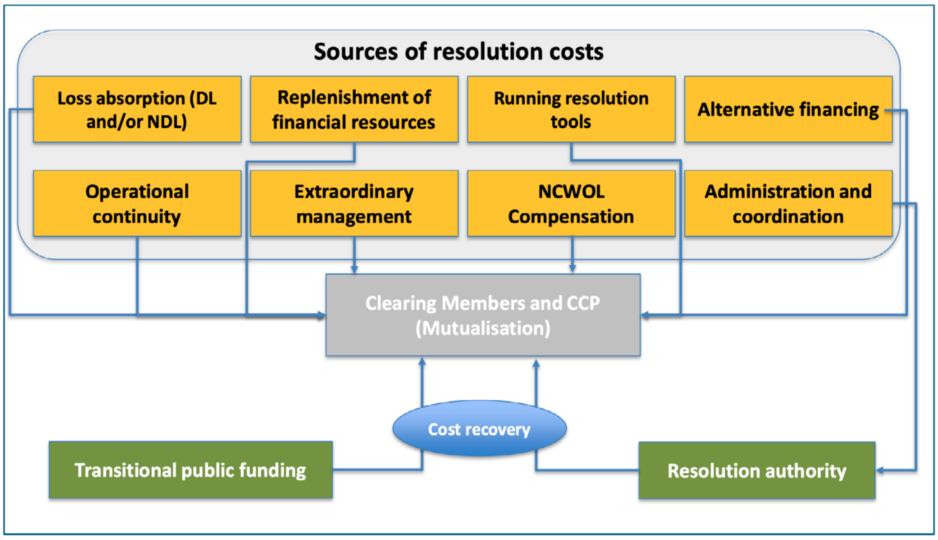
The possible use of temporary public funding, envisaged under exceptional circumstances, does not relieve the CCP or its participants of ultimate responsibility for the costs incurred. As provided in the FSB Key Attributes (2024c), "If, as a last resort and for the overarching purpose of maintaining financial stability, a jurisdiction determines that temporary public funding is necessary to achieve an orderly resolution, the resolution authority should have the power to recover such funding from the CCP or any successor entity, or any amounts obtained from a defaulting counterparty of the CCP, or from CCP participants or other market participants, in order to minimise the risk of losses to taxpayers and in a way that maintains incentives to support recovery measures of the CCP".

In accordance with the NCWOL principle, any compensation arising from a breach of this guarantee must also be covered from the resources of the system or of the CCP itself, preventing it from falling directly on public funds.

In this context, it is essential that the reorganisation plan that the CCP must present after its exit from resolution expressly contemplates the mechanisms to deal with these commitments. The plan should detail how outstanding payments, including those initially made by the resolution authority or arising from the NCWOL principle, will be financed, taking into account, where appropriate, any cost recovery that the CCP may make from the equity of a defaulting counterparty (including defaulting clearing members), and ensure that the resulting entity is viable, solvent and capable of maintaining the trust of its participants.

A clear and anticipated articulation of the distribution of these costs, including those associated with NCWOL compliance, is essential to ensure the legal and financial coherence of the resolution process, and to preserve its credibility in the eyes of the market.

Loss and resolution costs and sharing mechanisms FIGURE 1



Source: Authors' own work.

6 Possible future workstreams for refining cost estimation

The methodological development for the estimation of potential resolution costs remains an evolving area, particularly with regard to NDL scenarios and common costs. While the framework proposed by the FSB provides a useful and shared basis, its practical implementation requires specific adaptations to the operational characteristics of each CCP, as well as to the degree of technical and organisational development of the resolution authorities.

Several lines of work are identified that could contribute to the strengthening of resolution planning in this area:

- **Deepening the analysis of NDL scenarios**, with particular attention to identifying operational or financial thresholds that may trigger a resolution situation. Given that the resources available to deal with this type of event are usually limited, it is key to anticipate the point at which the cascade of financial resources could be exhausted.

- **Developing internal modelling and validation capabilities**, especially in DL scenarios. The ability to replicate or contrast the estimates made by the CCP internally using its own models would strengthen the supervisory function and increase technical autonomy in the evaluation of results.

- **Developing internal capabilities for business valuation**, which allow the resolution authority to be able to question, where necessary, valuations made by independent experts. This competence is especially relevant in resolution strategies that involve the sale of expendable businesses as a way to guarantee the continuity of critical functions and obtain additional resources that contribute to covering losses and resolution costs. The early development of these capacities increases the technical autonomy of the authority and reinforces the effectiveness of its decisions in crisis contexts.

- **Advancing in the definition of quantitative benchmarks for common costs**, including estimates on operational continuity expenses, replacement of resources and administrative and financial costs. These references could be built from internal simulations, sector benchmarks and analysis of historical scenarios.

- **Promoting a coordinated approach on the NCWOL principle**, in order to align ex-post valuation criteria and explore possible homogeneous compensation formulas, especially with regard to non-compliant clearing members.

- **Exploring legal and operational mechanisms for the recovery of post-resolution costs**, including those initially assumed by the resolution authority or derived from transitional public funding. This would involve reviewing the national frameworks for fees, contributions or reimbursements, and integrating them with the reorganisation plans required by European regulations. Also, developing technical and financial criteria to assess the feasibility of the CCP's reorganisation plan, in particular with regard to the ability to meet outstanding payments and restitution of resources.

- **Promoting participation in specialised international forums**, sharing practical experiences, at national or international level, or pilot exercises that allow the identification of good practices, common obstacles and recommendations to move towards the development of harmonised methodological frameworks and the design of comparable templates between jurisdictions.

These lines of action are not intended to be exhaustive, but they constitute a useful starting point for the progressive development of a more robust, coherent and operational methodology. Continued progress in this area is essential to strengthen the credibility of the resolution framework and ensure its effectiveness in real contexts of tension.

With a longer-term view, it is also appropriate to open the debate on the structural differences between the resolution scheme envisaged for banks and that applicable to CCPs. In the banking field, at least in the European Union, support mechanisms have been established such as the Single Resolution Fund (SRF), which can be used both to finance liquidity needs in resolution and to meet possible compensations derived from the NCWOL principle. In contrast, the framework applicable to CCPs does not currently provide for equivalent mechanisms, although the revision of Key Attributes promoted by the FSB (2024b) includes as a possible tool the creation of specific resolution funds for market infrastructures. There are advantages and disadvantages to this option, but the possibility of using the SRF itself as a backstop for certain CCP resolution situations could also be considered, at least for exploratory purposes, especially given that the institutions contributing to that fund are in many cases the same as those acting as members of CCPs. Such a solution could facilitate crisis management in critical infrastructures, strengthening the confidence and stability of the financial system as a whole.

In line with this approach, the possibility of granting CCPs access to central bank financing could also be explored – even in cases where they are not formally classified as credit institutions –, provided that an adequate supervisory and governance framework is in place. The aim is not to propose definitive solutions, but rather to contribute to the debate and offer ideas that support the development of effective and coherent resolution frameworks aligned with the systemic risks these entities may pose.

7 Conclusions

The correct identification and differentiated estimation of potential losses and resolution costs in CCPs is a key element of the planning and credibility of the resolution framework. While the former allow the absorption capacity to be assessed in the face of different types of crisis events, the latter guarantee the operational, legal and administrative viability of the resolution process.

While the FSB's work has established a common methodological basis, its implementation requires further technical development, tailored to the characteristics of each CCP and the capacities of resolution authorities.

The analysis allows us to identify three main categories of losses and costs: those derived from DL scenarios, those associated with non-financial or non-default events (NDL), and the common costs applicable to any resolution situation. Each presents different methodological challenges in terms of assumptions, data availability and evaluation criteria.

In addition, the NCWOL principle constitutes a legal guarantee of the first order, with operational, economic and reputational implications that make it necessary to consider it comprehensively in the design and application of resolution tools.

The costs estimate must be accompanied by a reflection on their effective assumption. Clear mechanisms for sharing and recovering these costs, including those arising from the NCWOL principle or transitional public funding, is essential for the credibility of the resolution framework. Integrating these aspects into the reorganisation plan reinforces the coherence between the previous analysis and the real feasibility of its execution.

Finally, the work identifies several areas for improvement, including the development of internal capacities to estimate and validate costs, the construction of quantitative benchmarks for common costs, the clarification of thresholds that would trigger resolution in NDL scenarios, the need to ensure that cost-taking and recovery mechanisms are adequately foreseen in planning, and international coordination to achieve a greater harmonisation of approaches. These actions will be critical in order to move towards a more effective, credible and legally sound resolution framework.

It is also appropriate to open a broader reflection on the possible convergence between bank resolution frameworks and market infrastructures, including options such as the creation of dedicated resolution funds or access to common support mechanisms, in order to strengthen crisis management capacity for the benefit of financial stability.

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