Recovery & Resolution

A Framework for CCPs

The Markets' Partner

Dealing with the failure of a CCP has become the key question in ensuring financial stability...

It's time to look at the big picture.

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01. Executive Summary

Post-crisis regulatory reforms have already done much to strengthen the resilience of the financial system, and banks in particular. And LCH fully supports the continued efforts of CPMI-IOSCO, Financial Stability Board (FSB) and policymakers around the world to create a regulatory framework that will further enhance the resiliency of central counterparties (CCPs).

Strangely enough, the ways in which a CCP can fail do not appear to be well understood. The current resolution debate tends to focus on the default of one or more members of a CCP. The ability to achieve a matched book in the event of a member default is core to the mission and responsibilities of a CCP, with robust measures in place to deploy financial resources according to its default loss waterfall. Trying to add more financial resources or additional recovery tools to this already established framework does not address the key issues, in particular non-default loss events, which result in a CCP suffering direct losses to its capital base.

Recovery and resolution for CCPs cannot be considered in isolation from the recovery and resolution regimes of clearing members, which have been introduced in recent years. These materially reduce the risk and the potential scale of a member default. If a bank's CCP liabilities are not subject to bail-in then the CCP would also have the absolute benefit of the member's own recovery and resolution plan and resources prior to the beginning of the CCP's own waterfall.

In our analysis, there are nine fundamentally different scenarios in which a CCP can get into difficulty. Chapter One identifies and outlines these scenarios, separating them into two distinct areas: *risks associated with a clearing member default*; and *non-default losses*. The paper then outlines how a CCP's business activities mitigate against failure for each scenario (Chapter Two) before considering what would happen if the risk defences were to break down (Chapter Three). Chapter Four outlines the role of the Resolution Authority in the context of a CCP, which for simplicity can be grouped into three areas:

01. Events where the CCP can recover a balanced book without adverse impacts on the CCP's capital, and therefore without the intervention of a Resolution Authority

02. Events which will require prompt, co-ordinated intervention by various authorities to deal with the failure of systemic third party players

03. Events which would directly hit a CCP's capital and could lead to the intervention of regulators or a Resolution Authority.

Resolution is most appropriate when the capital available to a CCP has been eroded to a point where it is no longer in a position to meet its minimum regulatory capital requirements. This would most likely be the result of non-default losses that are especially hard to mitigate although the clearing service itself may still have a balanced book.

CCP resolution will require rapid and effective decision making and is therefore more suited to the clear direction of one single Resolution Authority, underpinned by a recognition framework between the relevant jurisdictions and their respective insolvency regimes. While it is likely to be most effective when led by the home Resolution Authority of the CCP, it is imperative that information sharing mechanisms are developed to allow authorities to fully understand the impacts of their actions both at home and abroad. Commercial sensitivities and legal obstacles must be overcome to enable Competent Authorities to respect the interconnectedness of global markets.

The role of a Resolution Authority should be focused on continuity of service and we recommend that the framework focuses on this point. When establishing a framework, we would encourage policymakers to focus on ways to ensure a CCP can continue to manage flows of cash and assets while minimising the impact of a CCP's exposure to the failure of other key infrastructures. While it is important to consider how resolution will be funded, the default waterfall is not where these resources are needed. Requiring the CCP or clearing members to hold more capital in the form of a separate resolution fund is not the answer. If a CCP is mandated to hold significantly more capital to cover resolution, and ensure it still meets its cost of equity for shareholders, then the result would be a corresponding significant increase in clearing fees.

Under EMIR, each CCP has a component of its capital designated to cover wind-down risk[i]. If each CCP were to place these resources in a central account, controlled by a third-party, then the size of the resulting fund would provide enough cover to a Resolution Authority to handle the simultaneous collapse of at least the largest two CCPs in Europe. Importantly, this solution also means that there is no recourse to a taxpayer.

It is hoped that this paper will prove useful in informing the policy debate.

02. Taxonomy of Ways in Which a CCP Can Fail

There are essentially nine different scenarios that might cause a CCP to fail:

01. Clearing Member(s) Default

The mitigation of the default risk of market participants is the core purpose of a CCP. The default risk that exists between market participants is replaced by the risk to a single counterparty (the CCP) which becomes the buyer to every seller and the seller to every buyer. This counterparty risk that exists in normal market activities is then mitigated by ensuring that enough resources are held at the CCP and that the rules governing the interactions between the CCP and its members are suitably robust.

02. Liquidity Shortfalls When a Clearing Member Defaults

Such events primarily arise when the default of a clearing member requires the CCP to liquidate collateral in order to meet the variation margin obligations to the non-defaulted members. The CCP may have problems in liquidating collateral quickly enough even though it has sufficient financial resources in totality to cover the necessary liabilities. Here the problem is not a capital problem per se, but a shortfall in liquidity.

It is conceivable that a liquidity shortfall could arise in other situations not involving a clearing member default. These are discussed in 06 and 07 below.

Risks 01 and 02 are associated with a clearing member default – the traditional risk of a CCP, and where debate around CCP resolution has typically been focused, to date. However, there are other situations where the CCP may find itself challenged even though no clearing member has defaulted. These are events which affect the CCP capital directly and the CCP has little or no recourse to member margins as a back-up. These are the so-called non-default losses.

03. Investment Losses

Under EMIR, a CCP can have no more than 5% on average of its margin placed unsecured on deposit with a commercial bank[ii]. Since EMIR also excludes the possibility of investing in money market funds, the CCP is then forced to "store" margins in the repo market, until such time as it needs to repay them or use them to cover a liquidity event. It could also buy bonds outright as an investment. As a consequence, the CCP is (reluctantly) exposed to mark to market risk and the potential default of a repo counterparty, or the default of a bond issuer in its outright investment holdings. This could result in the CCP experiencing a capital loss even though member positions are unaffected.

04. Operational Risk Events

The CCP could experience an operational loss event which may (or may not) be associated with a clearing member default. Examples range from a process breakdown such as a mistake in the daily margin call to an incorrect booking of an investment trade, to plain outright fraud and cyber attacks. In many such cases, there may be no impact on the clearing members themselves and the margins posted by the members are potentially not available as a remediation tool.

05. Legal Risk

The CCP's rulebook and the contracts that it has with clearing members, trading venues and other market infrastructures forms the backbone of how the CCP operates. These vital elements are underpinned by a legal framework that is carefully managed. Legal risk management ensures that:

A. The CCP can enforce the powers within its rulebook to enable it to perform its function as a risk manager;

B. The CCP can perform its function within the legal framework of a third jurisdiction; and

C. The CCP operates within its regulatory obligations

The management of legal risk ensures the CCP's rulebook and its contracts are enforceable under applicable law and that the actions that CCPs take under such rulebooks cannot be open to challenge or reversal.

06. Failure of a Custodian or Settlement Platform

These counterparties are critical to the financial infrastructure in general and to a CCP in particular. Their failure would create a serious issue for the CCP and would primarily mean that it would be unable to transform securities into cash. This could create a short-term liquidity bottleneck: the CCP may have sufficient financial assets but be unable to gain possession of those assets fast enough to turn them into cash to meet its daily obligations.

07. Failure of a Settlement Bank or a Concentration Bank

To manage the margin process most efficiently, a CCP may make use of an embedded payment system. This is facilitated by a network of settlement banks that direct margins onwards to the CCP on the members' behalf. For example, at LCH these are known as Protected Payment System (PPS) Banks. The margins are aggregated and sent to designated concentration banks. In some cases these banks may even be a member of the CCP, in such case the member performs a self-PPS.

This is a two-way process between members and CCP to manage both the margin calls and the margin pays in an efficient manner. A failure of one of these intermediaries could result in the CCP being unable to pay its obligations on time, particularly if it does not receive the cash it is expecting.

08. Impact of Central Bank Actions

Actions by central banks may have unintended consequences for CCPs. For example, bond buying or quantitative easing could weaken the CCP by distorting the risk premium in the markets and potentially putting downward pressure on margins (the primary defence of the CCP). Such actions may also create volatility in the mark to market on the investment portfolio, particularly when they are unexpected, as this may leave the CCP with an unbalanced risk position for a short period while the market adjusts.

09. Non-performance of Vendors, Service Providers and IT Suppliers

This is the risk that the use of service providers, data vendors and IT suppliers causes business disruption or negative impact on business performance. A CCPs use of third parties could include:

A. Data provision

B. IT services/platform outsourcing

C. After-hours help desks

D. Disaster recovery

E. HR services

F. Legal services

The failure of a business-critical supplier has the potential to disrupt a CCP, particularly during a systemic event.

03. Defences Against CCP Failure

A CCP has robust and comprehensive defences in place to manage and mitigate the risks we have outlined, which could cause it to fail.

01. Defences against Clearing Member(s) Default

Predictably, this category has the most developed defences.

The starting point is the CCP rulebook, which is a legally binding document signed by members that governs all clearing activities. It details the powers of the CCP to assess appropriate margins, to place a member in default and to liquidate the defaulted member(s) portfolio of positions, most commonly through an auction or liquidation on exchange; as well as the resources which are available to carry out this liquidation and the process by which it is carried out.

A. Membership criteria which are the minimum standards that a CCP employs to determine whether potential members are eligible to join the clearing service, and the conditions under which they may be expelled.

B. Initial margins posted by each member which are calculated to a certain confidence level over a prescribed holding period.

C. Additional margins which are assessed bilaterally to cover concentrated positions, wrong way risk and any deterioration in member credit quality.

D. Collateral acceptance criteria and minimum haircuts to be applied.

E. Minimum cash margin requirements to ensure enough liquidity is available to the CCP.

F. Default Fund (or Guarantee Fund) which consists of the mutualised resources posted by clearing members. The CCP can only use the Default Fund after all margins posted by the defaulted member(s) have been exhausted and the CCP has used up its "skin in the game".

G. At this point in the waterfall of losses, if all financial resources have been used, the CCP can call on the membership for "unfunded assessments".

H. Many CCPs have an additional power of assessing variation margin gains haircuts (VMGH). This means that winners may not receive as much as they expected (i.e. the variation margin due to them is haircut) while losers are still required to pay any VM due in full.

I. Where these measures fail to restore a balanced service, the CCP ultimately retains the right to tear up member contracts in order to restore a balanced book.

02. Liquidity Shortfalls When a Clearing Member Defaults

The challenge in a stressed market environment is to take securities posted as collateral and transform them promptly into cash. Primary defences include:

A. A strict collateral acceptance policy to ensure that any securities held as margin are extremely liquid and would remain so during a stress event without experiencing a significant loss in value.

B. A minimum cash requirement across the membership to control the cash/non-cash mix of collateral and ensure there is sufficient cash on hand available in the event of a clearing member default.

C. A strict liquidity regime whereby all eligible securities collateral is tiered by liquidity. Limits on liquidity coverage ratios can be imposed to ensure collateral held is sufficiently liquid when required.

D. Contingent Committed Liquidity Facilities (CCLF) or equivalent rulebook based forced liquidity facility: As part of the criteria for membership a CCP will demand a member commitment through which it has the power to repo certain securities in return for same day cash.

E. A CCP may use its rulebook as a further defence, by demanding that no member is allowed to place the CCP in default for non-payment of margins due until a certain time period has elapsed. This allows the CCP more time to liquidate securities. In extremis, the CCP may demand the right from its members to pay variation margin due in another currency or in acceptable collateral.

F. Access to central bank(s) so that the CCP can deposit cash or engage with the central bank(s) in repo activities. It is not available to all CCPs, but where the facility exists it does provide the CCP with a guaranteed mechanism for transforming eligible collateral into cash at very short notice.

03. Investment Losses

Broadly speaking, these losses arise from the process of investing margins and fall into two types:

A. Where the CCP has a principal counterparty credit exposure to a market participant (not necessarily a clearing member), who then defaults. The primary defence for the CCP is ensuring that, wherever possible, the exposure is collateralised in the repo market and managed through a delivery versus payment process. In the event a CCP is owed cash and the counterparty then defaults, it will have approximately the same principal value, though it will be in the form of securities which it will then need to liquidate.

B. When collateral held by the CCP falls sharply in value. For any outright bond position held by the CCP, this would result in a market loss upon disposal of the bond.

These risks highlight the key role played by establishing strict investment criteria agreed with the members. As long as these criteria are being followed, the investment risk can be controlled, although the risk may not be completely eliminated. For this reason, some CCPs may allocate such loss back to the membership, as the CCP is forced to expose the margins to market forces in order to store them safely using the pre-agreed investment criteria. Some regulators (though not all) have recognised this investment risk and require CCPs to have an explicit solution to address it.

In some jurisdictions, money market funds are eligible for CCP investment. This reduces the necessity to use the repo markets. However, a CCP that has invested in money market funds may be exposed to redemption risk or "gates" which can be imposed by the fund as a mitigant against excessive cash outflow.

04. Operational Risk Losses

Operational risk underpins every internal process managed by a CCP and includes the oversight arrangements of external service providers. CCP's need to ensure they have a robust enterprise-wide risk management framework in place that ensures risks are identified, managed and monitored in compliance with the CCP's risk policies and within the CCP's risk appetite. The key risk mitigant for a CCP is the effectiveness of its risk control structure which should be expected to follow a three lines of defence structure with:

A. The first line of defence responsible for the identification, assessment and management of risk including the operation, validation and assurance over the core controls deployed within the CCP.

B. The second line of defence responsible for the risk management framework and process including the oversight and challenge of the first line's operation of the core controls.

C. The third line that provides independent assurance over the internal control framework of the CCP.

This risk control framework acts to proactively identify and improve any process weakness discovered so as to prevent the operational risks from being fully realised. This should reduce the potential frequency of occurrence of the risk and/or reduce the impact if the risk were to occur.

In many cases an operational loss will not materialise unless there is a member default. For example, a CCP may have a weakness in its process for calling margin resulting in members being undermargined relative to its own standards. However a loss would not materialise unless there was a member default which left the CCP short of bilateral margin with no choice but to use its "skin in the game" and the mutualised resources in the guarantee fund.

While those operational losses contingent on a member default are, by definition, rare, other types of losses can potentially be more common. For example, consider the booking of trades in the margin investment process. A mistake here is likely to be with a non-member as a counterparty and would be made in a non protected environment in that any resulting loss would fall to the CCP itself. The potential frequency of such a loss is determined by the effectiveness of the internal control environment of the CCP. In the final analysis, this is the only mitigant available. One could make a case for taking out insurance cover, but insurance would not affect the likelihood of occurrence, only the severity or impact of the loss.

05. Legal Risk

A CCP can mitigate legal risk by fully understanding the legal regimes in which it operates and taking appropriate legal advice from external counsel as to enforceability of its rulebook and any other contract that it may have with its members. A CCP manages a robust legal framework with three core components:

A. Performing due diligence on all of its activities and contracts

B. Ensuring the legal opinion upon which its decisions are based are sound and reliable

C. Obtaining robust legal advice from appropriately experienced counsel

CCPs should attain a high degree of certainty that the actions they may take under their rulebook cannot be challenged or reversed.

06. Liquidity Stress from the Failure of a Custodian, CSD or Securities Settlement System

CCPs use custodian banks, central securities depositories (CSDs) and securities settlement systems for a range of purposes: safekeeping of non-cash collateral provided by members; holding securities acquired through the investment of cash margin and default funds; and settlement of cleared securities transactions.

Without engaging with these participants, it would not be possible for a CCP to provide the clearing service at all. It is therefore imperative that a CCP has appropriate backup plans in place for how to cope if such market participants were suddenly unavailable. Since non-cash margins are bankruptcy remote for these types of market participants, this comes down to the short-term question of how to manage the liquidity implications to ensure enough cash is available to pay out daily member VM requirements.

For a Custodian, this could mean that a significant amount of non-cash collateral might become temporarily unavailable but this would only create a problem in the short term were a clearing member to default. In that case, the CCP would need to have immediate access to the non-cash collateral posted by the defaulted member. As a backup, the CCP would therefore need to ensure that a sufficient amount of liquidity – typically enough to cover the obligations of the two largest members – was available in cash, which it can do using its liquidity management framework.

For Settlement Platforms, the CCP needs to have a fallback. For example the rulebook could specify that clearing members cannot place the CCP in default within a specified time which is enough to allow the situation to resolve itself and the CCP to recover its frozen positions.

However, there is no defence if a settlement platform becomes unavailable and the CCP is unable to recover the principal positions stemming from margin investment activities undertaken on its own behalf or transform securities into cash. This is a very serious situation affecting the whole securities market and such a failure can only be addressed by the relevant Competent Authorities working cooperatively together.

07. Failure of a PPS Bank or a Concentration Bank

A CCP may run an embedded payment system, such as LCH's PPS, to manage the margin flow between it and the members. If there is no default, then the CCP is in balance and all inflows and outflows are perfectly matched. However, problems can occur:

A. Default of a settlement bank. Some CCPs protect themselves against the default of a settlement bank through a mechanism called Extended Member Liability (EML). This is where the member remains liable to the CCP for the margins until such time as the margins have been transferred to the Concentration Bank. Members are required to have backup arrangements with their settlement banks to ensure any margins can still be paid to the CCP were their settlement bank to fail. In a situation where the settlement bank is also a clearing member, the CCP will have sufficient financial resources available to meet the cover 2 standard.

B. Default of a Concentration Bank. The balance in a Concentration Bank is effectively an unsecured exposure of the CCP. As long as inflows and outflows remain balanced, the residual exposure at any point in the day is small. CCPs defend against the default of a concentration bank by closely monitoring and effectively managing the intraday exposure using a limit framework, such that a crystallised exposure would not be sufficient to exhaust the CCP's capital.

08. **Impacts of Central Bank Actions**

An unexpected move by central banks can leave a CCP unbalanced from a risk perspective while it and the markets adjust. Although it is not always possible to predict such actions, nevertheless there are steps that the CCP can take to mitigate the effects if they do occur. The principal mitigant is to implement a strong procyclicality risk standard in which internal risk models are built to incorporate large market shocks without any excessively large accompanying margin moves. This is not easy to do, but essentially the CCP has to control the rate at which margin is returned to members during benign market periods so that when a sharp movement does occur, margins do not have to be raised too much to compensate. There is a growing awareness among the regulatory community that the existing procyclicality standards need to be strengthened and some CCPs have already taken the initiative by implementing stronger standards than the minimum requirements to handle this kind of risk.

09. **Non-performance of Vendors, Service Providers and IT Suppliers**

The primary tool to manage this risk is through contract negotiation and tightly defined Service Level Agreements (SLAs). SLAs will clearly lay out expectations as to the minimum level of service required, with the inclusion of penalty clauses, where compensation is paid as remedy in a potential breach of the agreement. Of course, some vendor services are more important than others and the CCP will have a tiered approach in managing the associated risks.

For each critical vendor service, the CCP requires the vendor to have business continuity and incident resolution frameworks in place that meet or exceed the CCP's own standards. In addition the CCP will have a clearly identified continuity strategy in place which can be triggered promptly to allow the smooth continuation of the clearing service in the event of disruption to the vendor service.

04. What Happens When Risk Management Defences Prove Inadequate?

Now let us consider what would happen if a CCP's risk management defences were to break down, however remote that possibility might be.

01. **When defences against clearing member default(s) are not enough**

If a clearing member defaults, the CCP will liquidate the member's position utilising financial resources according to its default loss waterfall. If the positions cannot be closed out using the mutualised resources of the non-defaulted members, then the CCP will initiate a call for more resources in line with the powers laid out in the rulebook.

If these additional resources are not enough, then the CCP may invoke a loss allocation mechanism, for example variation margin gains haircutting (VMGH), which will allocate losses among the "winning" members, by haircutting their market gains.

While such processes do get the CCP to a matched cash flow position each day, this is short lived and there will be margin calls and pays at the next pricing update. To prevent the membership being caught in an infinite loop of rebalancing, the CCP may invoke a contract tear up or cash settlement to terminate the process under its rules. Some CCPs are looking to amend their rulebooks to allow for partial contract tear ups as there may be no sense in closing an entire service when only a small segment may be causing a problem.

Thus far, all the actions described above have been pre-agreed with members and documented in the CCP rulebook. These actions are designed to restore the CCP to a balanced book through actions that are within the power of the CCP and are recognised as legitimate recovery tools.

It should be noted that if any member were to fail to meet any cash payments due in this process and therefore be exposed to being designated in default under the CCP rules, the supervisory regulator would have to agree before the default was declared. In this way, the spectre of systemic risk can be managed.

The process just outlined is guaranteed to restore a balanced book to the CCP. The CCP capital itself (apart from skin in the game) is untouched.

Default management is the core purpose of a CCP and rulebooks have been developed that will enable the CCP to manage the default and bring about a balanced book.

Intervention during this process by the Resolution Authorities of the CCP could be counterproductive. However, it is to be expected that the Resolution Authorities of clearing members (many of which are G-SIBs or affiliates of G-SIBs) would be actively playing a role.

Of course, close contact with authorities is a standard factor in the management of a member default. This engagement ensures the authority is constantly updated on progress and is aware of any risk factors that are proving hard to mitigate.

Whether a CCP is placed into resolution during the recovery process is at the discretion of the Resolution Authority with input from the national competent authority. If that happens, the recovery tools set out in the CCP rulebook may also be considered resolution tools available to the Resolution Authority.

There has been some debate as to whether Initial Margin Haircutting should be considered as a recovery/resolution tool. The policy rationale is that IM constitutes a significant level of financial resources, which could be made available to the CCP in extremis.

This would prove problematic on two counts. First, non-defaulting members' IM is already being used as collateral against the CCP's potential future exposures to those members. Depleting this resource would lead to members being under-margined and trigger immediate margin calls. Second, it would change the cash/non-cash mix of margins posted by members and this could in turn have a profound impact on members' behaviour and the liquidity profile of the CCP. Members could be incentivised to post as little cash as possible during a stress event if they felt that cash posted as IM would be vulnerable to being confiscated in resolution. Liquidity would then be non-existent at the very time it was most needed. It would also disincentivise the posting of excess margin to the CCP, potentially decreasing the efficiency of clearing in non-crisis periods.

02. When defences against liquidity shortfalls caused by member default(s) are not enough

In the event that one or more members default, the CCP will need to liquidate non-cash collateral and even though there are sufficient financial resources, there nevertheless may be a delay in obtaining the necessary cash to pay outstanding VM calls. As previously mentioned, some CCPs have a moratorium in the rulebook prohibiting a member from placing the CCP in default for non-payment of margin until after a certain time period has elapsed. A delay is not likely to occur if the CCP has access to liquidity facilities at the central bank of issue. Other CCPs have rulebooks which impose a CCLF or equivalent rule based liquidity facility on the membership to obtain the cash, or in extremis allow payment of margin in other currencies or designated financial securities. This means that the only remaining problem may be a potential liquidity shortfall in the investment portfolio, where the CCP faces the markets directly. This is dealt with in the next section.

A liquidity event does not, in the longer term, cause a solvency threat to a CCP. Therefore the notion that the CCP would be put in resolution while managing an event of this kind is problematic. There is of course a role for the authority regulating the failed clearing member (whether that is its supervisor or a resolution authority) to release the necessary funds to enable the CCP to carry on its business.

Authorities need to ensure significant infrastructures, such as CCPs, are not hindered in obtaining the flows necessary to prevent the default of a member causing wider market contagion.

03. When defences against investment losses are not enough

If the CCP has executed a reverse repo with a market participant, and that participant defaults, then the CCP can liquidate the other repo leg to generate approximately the same amount of cash. The main problem is if the CCP experiences a delay in the liquidation, as there is only a short time window in which to pay the market counterparty before the CCP itself is in default. The rulebook moratorium against calling a CCP into default only applies to the activities of clearing members. This leaves the CCP with the following choices:

A. Use the available cash margin generated for the margin pays each day to smooth out the liquidity needs.

B. Resort to the repo market, where the CCP has pre-arranged and highly reliable facilities in place with many market counterparties.

C. Use committed CCLF arrangements or other committed arrangements to make up any cash shortfall, although there are questions as to whether such commitments will be honoured in extremis.

Of course if the CCP has access to deposit facilities at the central bank, then it will have immediate access to the cash it has deposited.

When the CCP investment portfolio contains a security that declines materially in value, this change in value could hit the CCP capital and even exhaust it.

A. If the decline is due to the default of the issuer, then some CCPs may have a defence in that any loss can be allocated back to members, though there is still a question as to how to fund that loss in the interim while waiting for the member allocations to be received.

B. If the security is an outright position held by the CCP, then liquidating it will crystallise a market loss.

Without access to a deposit account with a central bank or Committed Liquidity Lines, the CCP is ultimately dependent on the repo market to deal with any liquidity shortfalls. However, there is evidence that repo capacity has been in steady decline driven by the constraints on banks imposed by the Supplemental Leverage Ratio.

In all cases here, if the risk management defences against an Investment Loss were to fail then losses would hit the CCPs capital directly. Though such losses are extremely unlikely and there are strong risk management defences in place to mitigate them, nevertheless, **this is the first category of losses that could conceivably give rise to the need for CCP resolution.**

04. When defences against operational risk losses are not enough

The defences available to the CCP are the capital set aside for operational risk and the risk framework itself. Any event in this category which is realised in a financial loss will ultimately hit the CCP's own capital directly without any of the mitigations such as rulebook powers or members' margins/default fund contributions which can be used for normal clearing risks.

Insurance may be a useful defence, but depending on the underlying cause of the loss it may not always be and effective protection. Even if the CCP were entitled to collect the proceeds, it could take some time to get the actual cash needed to refresh capital, and how would the gap be funded in the meantime?

Of course, an operational loss event which depletes the CCP's capital is extremely unlikely to occur given the defences just described and the nature of the operations of a CCP. Nevertheless, were it to occur, this would be the second category of losses that could conceivably require a Resolution Authority to intervene.

05. When defences against legal risk are not enough

In the event of a failure of any of the functions of the legal framework, the CCP is at risk of:

A. Being unable to carry out it's risk functions effectively

B. Subsequently being subject to litigation leading to reputational and financial losses

C. Being subject to regulatory sanctions and fines

Failure of this nature requires robust legal advice to ensure mitigation of potential legal risk and advice must be sought on all decisions made that affect or impact how the CCP carries on its function.

In the event that a legal risk crystallises, member margins cannot act as a buffer, therefore the capital of the CCP is put at risk while other measures such as insurance policies pay out.

06. When defences against the failure of a Custodian or Settlement Platform are not enough

Were a Custodian to fail, although the securities held at that entity are bankruptcy remote, there might be a delay in liquidating a defaulted member's securities to generate the cash necessary to pay the VM owed to the non-defaulting members. However the moratorium against a member calling the CCP into default should provide enough time for the CCP to access the securities inside the Custodian and then liquidate them.

The situation for a settlement platform is different. Here the account of each member and the CCP contain the unsettled legs of a repo transaction. While the securities are bankruptcy remote, the cash is not, as it is fungible within the (I)CSD account structure. Here there might be a delay in the CCP accessing its securities if the (I)CSD is in difficulty and it would still need to liquidate such securities anyway.

Failure of a Custodian or a Settlement Platform does not lead to a situation where the powers of a Resolution Authority apply. This is not a solvency event but an issue of liquidity due to an inability to obtain assets owing to the CCP.

A failure of this kind points to the need for an accelerated process to free up securities from the (I)CSD in such an event; and since the positions of many market participants would also be frozen, such a process could only be run via a concerted, prompt intervention by the competent authorities. While not a role for a Resolution Authority, there is a need to review frameworks that would not hinder access to assets that could lead to further market instability.

07. When defences against the failure of a PPS bank or concentration bank are not enough

If a PPS bank were to fail, then the CCP has the protection of Extended Member Liability, in which case the risk is owned by the member and financial resources and the various rulebook safeguards are held against this risk in the normal course of business.

Resolution could be triggered by a concentration bank failure as once the margins leave the settlement bank the risk transfers to the CCP. In that case, the CCP effectively has an unsecured short-term exposure to a commercial bank and while there are risk management safeguards to defend this exposure, any defect here would create problems for the CCP. Many members could have cash margins being processed by the concentration bank and these would all be impacted by a failure of that bank. However, this problem can be limited in that the flow of money from the PPS banks can be halted to implement another route for margins to the CCP.

08. When defences against central bank actions are not enough

If a sudden and unexpected central bank action were to occur and the CCP's procyclicality defences were not adequate to handle it, the CCP would be left with an unbalanced book for a short period, and would be vulnerable to a member default if it were to happen at precisely that time. Note also that the chances of a member default would be greater than usual in such an event, as would the chances of a multiple member default. The recovery tools described above for the case of member default(s) would kick in as normal to force the CCP back to a balanced book, but the remedy may be more severe.

A real concern is the potential impact of central bank action on the underlying securities in the investment portfolio, where the CCP may potentially receive a sudden blow to the value of assets held, and hence directly to its capital. The CCP capital could be significantly eroded, potentially triggering the need for a Resolution Authority to step in.

The action of central banks and governments can be hard to predict. However, as resolution for CCPs is now a key agenda item for policy makers globally, we trust that policy makers will fully consider the potential implications of such actions for CCPs and other market infrastructure will be ensured.

09. Non-performance of vendors, service providers and IT suppliers

The CCP will have ranked the dependence on third parties by how important they are to maintaining availability of the clearing service. The most critical are likely to be:

A. Data providers

B. Third party infrastructure providers

If these services were suddenly to become unavailable, then the backup arrangements would be triggered. These will have been pre-planned and there will be a relatively seamless cutover.

If for some reason, there is a problem with these back-up arrangements, then there are essentially two scenarios to consider:

A. The CCP is unable to run the clearing service.

Here the CCP is unable to call or receive the appropriate margins from members and may be unable to handle a default event. It could then invoke the rulebook power to declare a moratorium on members' ability to force it into a default for a period of time, which will enable it to restore the service.

B. The CCP is unable to meet its treasury obligations to the market.

This situation is more critical as the rulebook will not give extensive protection against third party creditors of the CCP. This could have potential solvency implications for the clearing house.

A Resolution Authority will only be needed in the second scenario to help deal with potential CCP creditors. There is only a need for regulatory coordination in the first scenario to limit the systemic fallout of a CCP not paying or receiving VM calls.

05. The Role of the Resolution Authority in the Context of a CCP

The discussion so far has shown that there are (at least) nine fundamentally different scenarios in which a CCP can get into difficulty. These can for simplicity be grouped into the following three cases:

01. Some of these situations can be completely recovered in that there would be no impact on the CCP capital and the CCP can restore a balanced book within its existing recovery toolkit without intervention from a resolution authority. This includes clearing member(s) default.

02. Other situations require prompt, coordinated intervention by various authorities to deal with the failure of systemic third-party players in the financial system.

    This scenario requires coordination between various Competent Authorities, where the CCP positions tied up in the third party failure can be unlocked for immediate use by the appropriate resolution authority if needed. However, there may be no need for resolution if it is not a question the CCP's solvency but merely a liquidity problem that needs to be resolved. This could actually be addressed by the relevant regulator.

03. The remaining situations would hit the CCP capital directly and may (or may not) lead to an unbalanced book in the CCP.

Flexible & Appropriate Intervention

As this paper has identified, the role of the Resolution Authority is appropriate in situations where the CCP capital is at risk and there is a solvency problem. In this case, we therefore suggest the Resolution Authority proceeds as follows:

01. First, it should assess whether the existing shareholders are willing to pay off the debts and recapitalise the CCP.

02. If they are not, it will need to gauge whether there is market support for the CCP to continue and, if so, it will need to transfer positions to a bridge CCP or sell the CCP entirely.

03. If there is no appetite from the market for the CCP to continue, or there is no systemic reason for the clearing market to exist, it would then need to wind down the CCP.

The following table outlines the scenarios where CCP resolution applies and the events that could cause it. It is possible for more than one of these events to happen at the same time, but the roles of the Resolution Authority and the Regulatory Authorities are described in each category. Of course, an event could span several categories, in which case the conclusions under each category would be relevant.

	Event Categories	Recovery Tools	Regulatory Authorities	Resolution Authority
01.	Clearing Member Default(s)	Existing CCP recovery tools can handle the problem by design	Plays a coordination role to mitigate systemic risk	None – as no CCP solvency event needs to be addressed
02.	Liquidity Shortfalls When a Clearing Member(s) Defaults	Existing CCP recovery tools and rulebook powers to stay default can handle the problem by design	Plays a coordination role to mitigate systemic risk	None – as no CCP solvency event needs to be addressed
03.	Investment Losses	Existing CCP recovery tools and rulebook powers to stay default	Potential role here to manage systemic risk	Potential for resolution powers, if the CCP is insolvent
04.	Operational Risk Events	Existing CCP recovery tools may be inadequate	Potential role to play here to manage systemic risk, as the CCP may be in default even though there is a balanced book	Potential for resolution powers, if the CCP is insolvent
05.	Legal Risk	Existing legal framework will manage risk	Role here to support legal challenge as may be appropriate	Potential role if CCP solvency threatened due to legal liability
06.	Failure of a Custodian or Settlement Platform	Existing CCP recovery tools may be inadequate	Major role here as technically the CCP is solvent, it just needs to seize its assets to transform them into cash	None – as no CCP solvency event needs to be addressed
07.	Failure of a PPS Bank or a Concentration Bank	Existing CCP recovery tools may be inadequate	Major role here as invoking Extended Member Liability could have systemic consequences	Potential for resolution powers, if the CCP is insolvent
08.	Impacts of Central Bank Actions	Existing CCP recovery tools may be inadequate	Potentially a major role here, as there could be a systemic issue	Potentially a major role, as could cause the CCP to have an unbalanced risk book and have depleted its capital
09.	Non-performance of Vendors, Service Providers and IT Suppliers	Existing CCP recovery tools may be inadequate	Potentially a major role here, as there could be a systemic issue	Potential for resolution powers, if the CCP is insolvent

Some argue that it is appropriate for the Resolution Authority to intervene in the instance of a clearing member default and that a CCP should be placed in resolution at some point before the CCP loss waterfall is exhausted, and before variation margin gains haircutting (VMGH) is applied. Even if it was accepted that the Resolution Authority should intervene in this scenario (which it is not), this idea would create some fundamental challenges:

A. The existing CCP rulebooks and powers are structured so that all losses on clearing activities are allocated, and the CCP's own capital remains untouched. Indeed, removing the CCP capital from the bottom of a clearing service waterfall has been a priority of regulators in the recent past, and this regime would have the opposite effect. Placing a CCP into resolution before the application of VMGH could easily result in a solvent CCP being placed into resolution – a very strange and legally uncertain outcome indeed, particularly from the point of view of the CCP equity shareholder.

B. This idea of early intervention would also conflate losses related to default of clearing members with other non-default losses, and this paper shows they are fundamentally different in nature and need to be addressed differently.

The counter argument of course is that the Resolution Authority needs to be mindful of systemic risk, and therefore needs additional powers to fulfill its mandate. However, upon closer examination, this argument may not be as strong as it might first appear:

A. Many CCPs have clauses explicitly built into their rulebooks that no clearing member is allowed to place the CCP in default until a certain time period has elapsed. So there is already opportunity to allow for some breathing space in a crisis and the Resolution Authority would not add anything in this regard.

B. If powers of partial contract tear ups were added to rulebooks, the CCP would then have the power to selectively close offending segments of a clearing service, without closing the entire service.

One then concludes that the only action a Resolution Authority might take that a CCP would not currently take, would be to use its discretionary powers to change the loss allocation to members for systemic reasons. Hence the CCP would move from a regime where all losses are completely allocated to surviving members to a regime where the discretionary powers of the Resolution Authority have created an unallocated loss, and that cost must then be allocated.

The obvious question is who would then pay for this residual unallocated loss created by the discretionary actions of the Resolution Authority under the banner of systemic risk management. One possibility is through mandatory cash calls, in return for CCP equity, with the existing CCP shareholders getting rights of first refusal. This is problematic for several reasons:

A. This would be tantamount to expropriation of the equity of existing shareholders.

B. The potential for dilution would have a negative impact on the value of the CCP equity.

C. The potential exposure of the CCP equity shareholders is unquantifiable.

D. There can be incentives for a member to game the auction process if there is potential to increase its equity in the CCP.

The crux of the matter is whether (and to what extent) there may be an incentive for a member not to submit an auction bid (or bid to miss) in the hope of engineering a significant equity stake in the CCP. This is very plausible and the danger could perhaps best be illustrated in the repo market.

Typically the repo market for a given sovereign has only a small number of players: some domestic banks and a small number of international banks. If the particular sovereign market gets into trouble, the most likely situation is that a domestic bank(s) would be in default and there would be large losses to be allocated. Indeed, there may be no bank in a position to bid on the defaulted member's portfolio without taking a significant risk position on its capital.

The international bank is then faced with a number of choices:

A. Submit a credible bid and, if the auction is successful, experience a large mark to market hit to profits.

However, the international bank would have a more interesting alternative if there was the prospect of an equity stake in return for the cash call.

B. Choose not to submit an auction bid, knowing that it may be perhaps the only credible bidder in this market. Remember, this bank has already seen the defaulted member's portfolio. This would virtually guarantee the failure of the auction and drive the CCP into resolution as it attempts to apply VM haircutting to restore a balanced book. In some cases, there could even be no members with VM gains. So it can easily happen that VM haircutting fails and the only thing left is contract tear ups.

Here a non-defaulted bank could easily conclude that the Resolution Authority may not enforce a tear up as this action could lead to a shut down of the market for repo in the sovereign debt of the country and the sovereign might not be able to fund itself.

Remember, the Resolution Authority would have to be circumspect about imposing heavy losses on the international bank, as without its participation, the repo market on that sovereign debt could not be restored. One would instead be left with domestic banks trading repos with each other and no external money being brought into the particular country. This would seriously curtail the ability of the sovereign concerned to fund its debt.

The upshot is that the international bank could well come to the conclusion that it would be better off not bidding in the auction and instead take advantage of the market structure and engineer an increased stake in the CCP. This would of course be at the expense of the local banks.

The situation would be even more pronounced if the service in question was just one among several. In this case, a local market failure in one small service could lead to an increased equity stake in a CCP which operates other significant services.

The challenge for authorities is that the CCP is a private sector solution to the problem of managing systemic risk, and any regime such as this would effectively discourage private capital sources and could even result in the government as the only potential source of capital to fund the CCP – which is precisely the opposite of what was intended.

It should also be noted that actions of CCPs, particularly around default management, are already taken subject to the agreement of the relevant regulator (who may also be the CCP Resolution Authority). This regime has operated well to date and works to prevent any action by the CCP that would be contrary to the public interest of systemic risk management.

The International Challenge

CCP resolution will require rapid and effective decision making and is therefore more suited to the clear direction of one single Resolution Authority, underpinned by a recognition framework between the relevant jurisdictions and their respective insolvency regimes. CCP resolution will be most effective if it is led by the Resolution Authority of the jurisdiction in which the CCP is established. The home Resolution Authority will be most familiar with the CCP's operations and will be able to act decisively.

The home Resolution Authority will want to cooperate closely with the authorities of other jurisdictions that have an interest in the CCP's resolution. In events where the failure of a financial institution could create contagion in multiple jurisdictions, the risk to market stability is great. Where a CCP is a significant infrastructure in multiple jurisdictions, the management of its failure by only one of these authorities will not cater for the risks faced by other countries where a different authority is in control.

These cross border complexities must be considered when resolution plans for CCPs are developed. Information sharing should be available to authorities in a way that is fast and accurate. Where authorities make unilateral decisions to wind down an institution in one jurisdiction, the impact to the whole, multi jurisdictional, network has to be assessed and managed to ensure a bad situation does not get quickly out of control. It should also be noted that the applicable resolution regime and legal framework will be that of the home jurisdiction of the CCP.

To this end, it is important that information sharing mechanisms are developed to allow authorities to fully understand the impacts of their actions both at home and abroad. Commercial sensitivities or legal obstacles must be overcome to enable Competent Authorities to respect the very connected world in which markets operate.

06. Funding Resolution

Any sale may take time to complete and would require the CCP to meet its minimum regulatory capital requirements in the interim. The decision to wind down the CCP would also require capital and the specific wind down capital that the CCP holds under the regulatory rules may have already been depleted by the crisis event.

This means the Resolution Authority would need immediate access to funds to replenish the CCP's regulatory capital.

There are three possibilities:

A. The taxpayer

B. The CCP itself

C. The market

It is clear that A is not an option.

It is tempting to force the CCP to raise additional capital and hold this in a Resolution Fund, but this is not really feasible for the following reason.

Imagine a typical CCP with minimum regulatory capital need $\mathbf{K_{reg}}$ and a SITG of 25%. If the CCP is running a 20% notification buffer, then the total capital held by the CCP is $\mathbf{1.2*1.25*K_{reg}}$. Suppose further that the CCP cost of capital is 10% currently. If the CCP has a current return on capital of r%, then one can calculate the maximum amount of SITG it can afford as $12.5*r-1$ before breaching its cost of equity to the shareholders.

This analysis shows that there is not much scope for a CCP to carry "dead capital" before it would start returning less than the cost of equity and would discourage private capital from funding the CCP. In other words, mandating a CCP to capitalise its own Resolution Fund would conflict with the policy of having a private sector solution to the problem of systemic risk, unless the CCP were to raise clearing fees substantially. In this case, the clearing members would effectively end up funding the solution.

The third option is the market itself as the source for capitalising the Resolution Fund. However, there is an opportunity cost attached to this and it has the potential to disincentivise clearing, which is counter to the G20 objective.

All three options for providing the necessary funds to a Resolution Authority appear at first sight not to be feasible. However, there is an alternative approach. Under EMIR, each CCP has a component of capital designated as resources to cover wind-down risk. If each CCP were to place these resources in a central escrow account, then the size of the resulting fund would provide enough resources to a Resolution Authority to handle the simultaneous collapse of at least the largest two CCPs in Europe, and in many circumstances, even more. Of course, the fund would need to be controlled by a third party, which could permit the drawdown of monies as appropriate.

To be more specific, the analyses of the previous sections demonstrate that the Resolution Authority would only require at the outset enough funds to restore a distressed CCP's capital to the minimum regulatory requirement, so that the CCP could be kept running while longer term solutions were being crafted. Any new buyer would of course need to replenish the CCP contribution to the funds in the escrow account. Of course, if no buyer were to come forward, the funds would instead be used to wind down the CCP.

07. Conclusion

LCH fully supports the efforts of CPMI-IOSCO, the Financial Stability Board (FSB) and other policymakers to create a regulatory framework that will protect the resiliency of CCPs. The current focus of the resolution debate, however, needs to look more broadly than at the default of one or more clearing members.

The ability to achieve a matched book in a clearing service, post member default, is core to the DNA of a CCP and the recovery toolkit that CCPs have in place to balance a service is robust and guaranteed to achieve stability. Trying to add more financial resources or additional recovery tools to this already established framework does not address the key issues.

We would encourage policymakers to focus on ways to ensure a CCP can continue to manage flows of cash and assets by minimising the impact on it of the failure of other key infrastructures.

In our analysis, resolution would only be triggered when the capital available to a CCP had been eroded, whether this is due to investment losses or operational failures that are especially hard to mitigate. When resolution is triggered, the focus of the Resolution Authority will be continuity of service. While it is highly likely that clearing services would continue to enjoy a balanced book, the CCP would no longer be in a position to meet its minimum capital requirements and would therefore likely be in breach of its regulatory requirements.

The failure of a CCP is an infrequent event, therefore trying to create a framework based on this past experience – or the experience of resolution of other types of financial institutions – can be misleading. We believe a comprehensive framework, such as that laid down in this paper, could form the basis for this analysis.

While it is important to consider how resolution would be funded, the default waterfall is not where these resources are needed. Requiring the CCP or clearing members to hold more capital in the form of a separate resolution fund is not the answer.

To create meaningful loss absorbency, the amounts involved if funded solely by the CCP would ensure that the CCP did not earn its costs of equity. If the CCP was mandated to hold significantly more capital to cover resolution, then the only alternative would be a corresponding significant increase in clearing fees.

There is a way to provide the resources needed for resolution - the capital currently exists and could simply be repurposed. It is an approach that could be implemented in Europe under EMIR, and a similar solution could work in other jurisdictions. As this paper has shown, CCP resolution would only be triggered when a CCP's capital had been significantly depleted and needed to be replenished. Our suggestion is for each CCP to hold its wind-down capital in a central escrow account under independent control. The sum of wind down capital across CCPs should create a fund sufficient to absorb the simultaneous depletion of capital for the largest two CCPs (or more in many circumstances). This would be sufficient to provide the Resolution Authority with the capital necessary to recapitalise a failed CCP to the minimum regulatory requirement, and allow some time for a buyer to be found. Any such buyer would then be obliged, as a condition of sale, to replenish the wind-down contribution to the central escrow account. If the Resolution Authority does not find a buyer, then the money would be used to close the CCP.

Finally, it is important to remember that post-crisis regulatory reforms have already done much to strengthen the resilience of the financial system, and banks in particular. Clearing members themselves are now subject to recovery and resolution regimes, and this materially reduces the risk of, and the potential scale of, a member default. Recovery and resolution for CCPs cannot be considered in isolation from the recovery and resolution regimes for their members; and if a bank's CCP liabilities are not subject to bail-in, then the CCP would have the absolute benefit of the member's own recovery and resolution plan and resources prior even to reaching the start of the CCP waterfall.

08. Glossary

CCLF

Contingent Committed Liquidity Facilities

CCP

Central Counterparty

CPMI

Committee on Payments and Market Infrastructures

CSD

Central Securities Depositories

EMIR

European Market Infrastructure Regulation

EML

Extended Member Liability

FSB

Financial Stability Board

G-SIBS

Global-Systemically Important Banks

IM

Initial Margin

IOSCO

International Organisation of Securities Commissions

PPS

Protected Payment System

SLAS

Service Level Agreements

VM

Variation Margin

VMGH

Variation Margin Gain Haircutting

09. Footnotes

[i] Article 16 of EMIR and Article 2 of the Commission Delegated Regulation (EU) No 152/2013 of 19 December 2012 supplementing Regulation (EU) No 648/2012 of the European Parliament and of the Council with regard to regulatory technical standards on capital requirements for central counterparties.

[ii] Article 45 of the Commission Delegated Regulation (EU) No 153/2013

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