



RECOMMENDATIONS FOR REDUCING RISKS AMONG INTEROPERATING CCPs

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1 . EXECUTIVE SUMMARY

Equity market participants in Europe want the ability to choose their central counterparties ("CCPs") and gain the benefit of concentrating their clearing business. For market participants to have such choice, their chosen CCPs must have access to multiple trading venues across Europe, which requires interoperability among multiple competing CCPs. Although interoperability may introduce new risks and complexities, market participants cannot fully realise the benefits of competition without interoperation among multiple CCPs. When multiple CCPs interoperate, each CCP becomes a counterparty to the other interoperating CCPs and requires additional financial resources to cover its exposure from the possible failure of any of the other linked CCPs.

EuroCCP believes that existing approaches to risk management, used for bilateral interoperability, may be inadequate to manage multi-CCP arrangements. Alternatives that are both scalable and sustainable and cover normal as well as extreme market conditions should be considered.

EuroCCP has four main recommendations:

- 1) Each CCP should augment its own existing default fund to cover potential close-out losses in the event of an interoperating CCP's default.** Under this arrangement, each CCP includes the exposure created by interoperating CCPs in the calculation of its default fund and collects any additional amount required from its own participants, retaining the funds in the usual manner that it holds its default fund. This approach does not require CCPs to give margin or default fund contributions to each other, but it does require mutual adoption by all interoperating CCPs. Most importantly, this approach does not disturb existing industry structure and can be quickly implemented.

By stipulating that each CCP augment its own default fund rather than contribute to other CCPs, each CCP's risk management remains self-contained. There is consequently no systemic contagion, and each regulator needs to monitor only the CCPs in its own jurisdiction.

We do not recommend that CCPs exchange margin because this practice would create credit risk, legal risk and liquidity risk. With multiple CCP links, for example, it is quite possible that a CCP may collect little or no margin from a participant but be obliged to pass on a substantial amount of margin to the interoperating CCPs. We also do not recommend that CCPs be required to use their own capital or borrowed funds to give to other CCPs as margin.

- 2) An Interoperability Convention among all interoperating CCPs should replace confidential bilateral agreements as soon as practicable.** A convention or similar agreement will provide to CCPs, their participants, regulators and trading venues a greater degree of transparency of how risks are managed and a heightened level of certainty of how problems will be handled when they arise.
- 3) Commercial barriers to interoperability should be removed.** While risk management must be addressed to make interoperability safe, the investment necessary to do so will yield inadequate returns if commercial barriers are allowed to prevent full and effective competition among CCPs. At present, market participants must still connect to CCPs appointed by the trading venues and potentially incur higher operating and margin costs than if they could freely choose the CCPs they prefer.
- 4) Longer term, we suggest further consideration of inter-CCP netting, whereby a netting agent would be established to determine each CCP's net securities and cash position against the other CCPs.** While it would take time to build and gain agreement on a common netting agent, this approach could substantially reduce liquidity and settlement risk.

This paper is intended to encourage discussion of the issues surrounding interoperability among CCPs, trading firms and regulators in Europe.

2. BACKGROUND

“Interoperability” and “competitive clearing” have become common terms in Europe’s equity markets. The European Code of Conduct for Clearing and Settlement (“Code”) provides the framework for competition among CCPs, but removing the commercial barriers to competition has proved to be complex and controversial.¹ While interoperability (“link”) arrangements among CCPs in Europe are not new, existing links are generally of a cooperative nature whereby a trading venue appoints two CCPs, each bringing with it a specific and stable population of trading firms.² Now that several competitive link arrangements are nearing completion, each governed by a different bilateral agreement, a number of European regulators are focusing on the potential for liquidity, credit and systemic risk that can arise amongst multiple interoperating CCPs.

¹ The European Code of Conduct for Clearing and Settlement, a voluntary Code, was written by FESE, EACH and ECSDA, the industry associations for European securities exchanges, central counterparties and central securities depositories, in November 2006.

² See “Link Arrangements of CCPs in the EU”, in The Role of Central Counterparties, European Central Bank, July 2007. <http://www.ecb.int/pub/pdf/other/rolecentralcounterparties200707en.pdf>

This paper considers the potential liquidity risks related to interoperability—the issue at the centre of the current multi-jurisdictional regulatory review that has temporarily suspended progress toward increased competition in equity clearing. It discusses several options regulators and CCPs could consider to mitigate the systemic risks that could be triggered from liquidity risks in multi-CCP links, and also presents options to minimise the credit risk to CCPs arising from the failure of an interoperating CCP.³

2.1. INTEROPERABILITY GUIDELINE

The Access and Interoperability Guideline (“Guideline”) to the Code states that, “Choice of CCP as demanded by users in line with Article 1 of the Code is best delivered by Interoperability between CCPs”. Interoperating links currently under consideration among several CCPs are peer-to-peer, in which “all CCPs receive the trades directly and simultaneously from the same source (Trading Platform or third-party)” and the “Requesting CCP should not be obliged to use the services of the Receiving CCP”.⁴

According to the Guideline, “The Receiving CCP recognises the Requesting CCP in its nature and regulatory status as a CCP and vice versa”. Specifically, CCPs should:

- Ensure there is adequate collateralisation to cover exposure to potential losses;
- Not have to contribute to each other’s default funds or secondary measures;
- Ensure that the default of a clearing member at one CCP does not affect the other CCP unless the first CCP itself is in default.

There is a general view that if increased risks from interoperability are appropriately identified and managed, if CCPs are regulated and comply with the relevant requirements of the authorities and if the regulators of interoperating CCPs coordinate with each other, then interoperability would be safe.

2.2. POST-LEHMAN DEFAULT

The Guideline was written prior to the Lehman default in September 2008, an event that increased the financial services industry’s sensitivity to risks, including risks related to interoperability. Inter-CCP dependencies necessitated by interoperability could create new systemic risks if the link

³ Other risks associated with interoperability, such as legal and operational risks including fraud, and risks not specific to competitive clearing in equity markets, are not in the scope of this paper.

⁴ The Access and Interoperability Guideline was written by FESE, EACH and ECSDA in June 2007.

arrangements have not been designed to minimise unnecessary stress on a CCP's liquidity or to withstand stressful conditions in the financial markets. As such, link arrangements already in place pre-Code should be re-examined with regards to their appropriateness in the context of both the current competitive multiple-link environment and the lessons learnt from the financial crisis.

3. CURRENT INDUSTRY CONCERNS REGARDING INTEROPERABILITY

Questions have been raised about the adequacy of the Guideline where more than two CCPs interoperate. The Guideline does not explicitly limit its relevance to the number of interoperating CCPs, but arrangements that are currently operational in the equity markets involve only two CCPs.⁵ The imminent implementation of more than two CCPs clearing for the same trading venue has surfaced a number of concerns among regulators and in the industry, some of which are equally valid even if only two CCPs interoperate. These concerns reinforce the need to re-examine existing link arrangements and establish a transparent and standard set of conventions.

3.1. CONTAGION RISK AMONG MULTIPLE INTEROPERATING CCPs

Contagion risk has been highlighted by the financial crisis. There are concerns that a CCP could be affected by the failure of another CCP with which it has no direct link, through a third CCP that both CCPs interoperate with.

Even though the ESCB CESR Recommendation on CCP links state that, "The initial risk assessment of the linked CCP should include sufficient understanding of the entirety of the other CCP's risk arrangements, covering any other link arrangements", in a group of multiple interoperating CCPs it is not possible to assess the safety of all other link arrangements because bilateral agreements among CCPs are currently confidential commercial contracts. For example, a CCP that interoperates with two other CCPs knows how risks are managed between itself and the others individually, but has no knowledge of how risks are managed between these two CCPs if they also interoperate with each other. In addition, clearing participants are not able to evaluate any new risks they are exposed to because they cannot review the link agreements their CCP enters into due to confidentiality restrictions.

⁵ There is an example of a link involving 3 CCPs in the Nordic derivatives markets, a segment that is not covered by the Code. The 3-CCP link is not a peer-to-peer mode; it involves a CCP acting as a hub for the others in a sub-CCP model.

3.2. LIQUIDITY RISKS ARISING FROM IMPLEMENTING “ADEQUATE COLLATERALISATION”

Where there is no interoperability, a CCP collects margin from each participant on both sides of a transaction to cover credit risk against a participant default. The margin is used to cover potential losses in closing out the margin-giving participant’s obligations if it defaults (“close-out losses”). Margin is calculated and collected from all participants daily.

When CCPs interoperate, there will be instances where a CCP has only one side of a transaction, with an obligation towards an interoperating CCP that has the other side. The Guideline’s provision that interoperating CCPs have “adequate collateralisation” has been interpreted by CCPs as the need for margin exchange, whereby CCPs give margin to each other to mitigate inter-CCP close-out losses.

However, margin exchange gives rise to liquidity risk because there are a variety of situations that may result in a CCP not being able to provide margin to another CCP when due. The complications with margin exchange currently under review include:

a. Re-use of participants’ margin and use of capital

A CCP would need to ensure it has sufficient liquidity to cover margin exchange of any amount. CCPs rely on their participant margin and default funds to protect themselves against close-out losses in the event of a participant default; they may also supplement this protection with capital and/or loss-sharing arrangements. Where margin exchange is required, one consideration is the use of participant margin and/or default fund contributions to satisfy any inter-CCP margin requirements (“re-use”).⁶ This practice reduces the risks inherent in CCPs using their own capital, but it creates other concerns.

Some CCPs’ rules prohibit the use of these funds for any purpose other than to cover close-out losses arising from their own participants, and some CCPs’ participant margin or default funds are held by a third-party bank under an agreement or in a form (such as a pledged account or letter of credit) such that these funds can only be accessed by the CCP in the event of a participant default. The prohibition of margin re-use avoids the risk that the margin will not be returned in the event of the margin-holding CCP’s insolvency, but it also means a CCP has to source its own margin requirement elsewhere. This

⁶ In this context, the re-use of participant collateral includes the taking of participant cash funds to acquire securities, which are then used for inter-CCP margin exchange.

situation introduces a higher liquidity risk than if participant-provided collateral could be used. It could also be costly for the liquidity-seeking CCP. This issue is present even when only two CCPs interoperate.

The use of a CCP's own capital to provide margin to another CCP is not, however, recommended as an alternative. Whilst CCPs are designed to manage the risk of their own participants, requiring them to tie up their operating resources with another CCP puts them at risk of insolvency. A CCP putting up its own capital is akin to the risk-taking undertaken by commercial banks. CCPs as critical market infrastructures should not be taking on credit risks themselves or pledge their capital as collateral to another CCP. Doing so may reduce the level of protection that a CCP provides to its own participants.

b. Margin collected from participants is less than the amount due to interoperating CCPs

Even if a CCP's rules allow it to re-use participant margin, it could still be exposed to liquidity risk if the amount collected from participants is less than the amount due to the other CCPs.

- i. Figure 1 illustrates potential problems with multiple-CCP links, where a CCP may collect little or no margin from a participant but is obliged to give a substantial amount of margin to the interoperating CCPs.

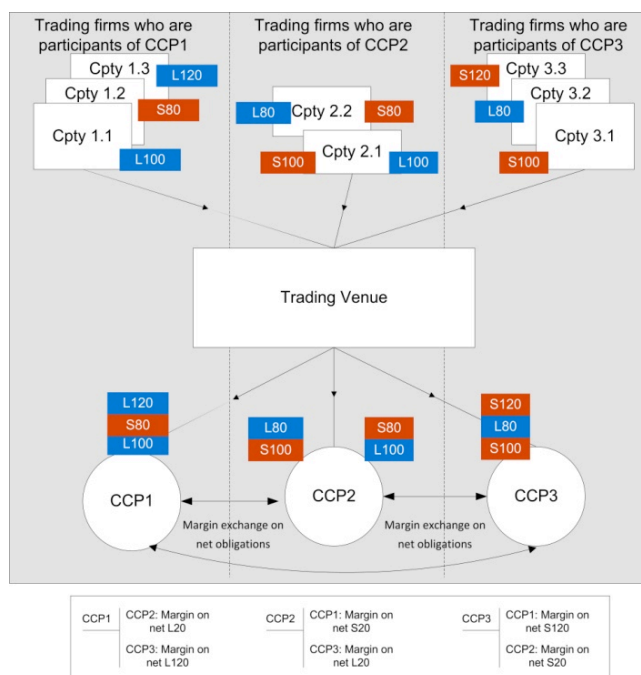


Figure 1 – Margin exchange on net obligations

For example, a firm could trade during the day but have no net long or short position at the end of the day. The trading venue has matched its trades with counterparties that use different CCPs. The participant's CCP would not collect margin from it as there is no settlement obligation from the day's trades, but the CCP may still need to give margin to the interoperating CCPs with which it has future settlement obligations, as it will have a buy position with one and the offsetting sell with the other. This liquidity problem is magnified for CCPs with a large number of participants using high-frequency trading strategies. These participants typically have large trading volumes but generally ensure they have a flat position at the end of the day. The probability of a CCP ending up with a series of buy and sell positions with interoperating CCPs, even though its direct participant is net flat, could be significant.

- ii. Even if a link concerns only two CCPs, the amount of margin collected from participants could still be insufficient to cover obligations to an interoperating CCP:
 - Regulations may permit a CCP to re-use only margin securing proprietary accounts but not client accounts, reducing the amount of liquidity available to the CCP.
 - One CCP could potentially require more margin from an interoperating CCP than the amount the latter has collected from its own participants, due to different margining methodologies.

c. A CCP holds insufficient margin from a defaulted CCP

The accepted procedure among CCPs currently working on interoperability is to calculate margin due from each other using the same methodology as used to calculate margin required from their own participants. The Guideline specifies that CCPs should not contribute to each others' default fund; hence, margin from an interoperating CCP is the only source to cover close-out losses caused by its default. A close-out loss that exceeds the amount of margin held has to be absorbed either from the margin-receiving CCP's capital, which weakens its financial condition and could even push it into insolvency, or shared among its own participants.

3.3. CCPs CONTRIBUTING TO EACH OTHERS' DEFAULT FUNDS

The Guideline states that CCPs should not contribute to each others' default funds. This guidance follows from the understanding that CCPs are not risk-taking intermediaries, should deal with each other as peers and so should not be exposed to the additional risk of loss mutualisation presented by its linked CCPs' own participants, something it will not have sight of or be able to

control. Moreover, any requirement for such a contribution gives rise to similar concerns about sourcing the contributing CCP's obligation either from its own capital or re-use of participant margin.

3.4. BEHAVIOUR OF COMPETING CCPs MIGHT DISRUPT MARKET CONFIDENCE

When CCPs compete, a CCP might be motivated to exercise its contractual right under a link agreement to declare another CCP in default. A CCP's breach of the agreement's margin-posting obligation could be due entirely to exceptional market conditions and a temporary inability to source sufficient margin, but not be accompanied by a substantive financial failure caused by the default of its own participant. There is a valid concern in this type of situation that its linked CCP might exercise its right to call a default, an action that would disrupt market confidence and systemic stability. The CCP exercising its right may feel a need to do so due to its fiduciary responsibility to protect its participants, but it may also be motivated to gain a competitive advantage.

4. OPTIONS TO REDUCE LIQUIDITY AND CREDIT RISKS

Under normal market conditions, a CCP that observes the ESCB CESR recommendations should have sufficient liquidity and financial resources to be able to handle even a major participant default without damage to its own financial condition. Link arrangements among CCPs, however, introduce additional exposures that need to be managed differently, especially in stressful market conditions.

The concerns that revolve around liquidity risks facing CCPs require a re-examination of current assumptions and practices in margin exchange. The concerns that revolve around credit risks require clarity on the circumstances that would lead to a CCP's insolvency, and how the remaining interoperating CCPs could protect themselves financially in that event. The potential solutions are interconnected: the more remote and more robust the protection against credit risk, the less need for inter-CCP margining practices that exacerbate liquidity risks.

The complexity of the situation results in a variety of potential solutions that could be undertaken by the industry or by regulators, although some of the solutions are mutually exclusive. In our judgment, several of the options presented in the following pages could be implemented by the industry within a matter of months once agreement has been reached among the stakeholders. We note, however, that some of the options would require CCPs to modify their rules and obtain the necessary

regulatory approval, while others would require significant time and could possibly be achieved only through legislative intervention. Some of these options need to be adopted by all CCPs to be effective, and some would probably need to be accompanied by a periodic regulatory review of compliance.

4.1. ELIMINATE INTER-CCP MARGIN EXCHANGE

The challenge of liquidity risks arising from margin exchange suggests a re-examination of whether it is necessary at all under normal market conditions.

The industry accepts that a CCP is a recognised clearing house regulated by a competent authority that has performed and performs regular reviews and supervision of the CCP. Regulators accept that the risk of a CCP going into default in normal market conditions is extremely low. A properly regulated and supervised CCP should have sufficient margin, default fund and loss-sharing among remaining participants and/or other protections against a participant default.

If one accepts the assumption that a CCP would become insolvent only under extreme market conditions, the daily margin exchanges that cause additional liquidity risks should not be necessary, provided there is sufficient mitigation against credit risk from an interoperating CCP's insolvency under extreme market conditions. Margin exchange might even give rise to a false sense of security if there is insufficient preparedness for risks arising from inter-CCP exposure during extreme market conditions and/or a weakening of the individual CCP facing insolvency.

4.2. USE BANK GUARANTEES TO SECURE INTER-CCP OBLIGATIONS

The use of bank guarantees among interoperating CCPs to secure their obligations to each other could solve the problem of those CCPs that are not able to re-use participant margin. It could avoid the credit risk of margin in the form of securities or cash not being returned in the event of a margin-holding CCP's insolvency. It is also operationally simpler, as a bank guarantee of sufficient size could be exchanged to cover actual needs plus some headroom. A bank guarantee arrangement serves the economic purpose of making funds available to cover losses in the event a CCP defaults on its obligations to another CCP.

Under extreme market conditions, however, the headroom could be exhausted rapidly, leaving insufficient time to raise a bigger bank guarantee. If link agreements between CCPs do not accommodate this situation by providing an adequate grace period for raising an additional amount of bank guarantee (or

if at the time that headroom is required, credit becomes unavailable), this option causes the same problem as margin exchange: one CCP could put the other into default and impair confidence in the financial markets, even though the financial health of the “defaulted” CCP is not being threatened.

In addition, there is a broad concern that, in extreme market conditions, the provider of the bank guarantee could itself go into administration and ultimately push the CCP into default as it is unable to find a new bank guarantor within the grace period specified in the link agreement.

4.3. AUGMENT EXISTING DEFAULT FUNDS

A CCP’s default fund is primarily intended to protect a CCP against losses under extreme market conditions when a defaulted participant’s margin amount could become insufficient to cover close-out losses. CCPs maintain default funds the size of which are usually determined by the requirement to cover close-out losses from the simultaneous default of the two or three largest participants under extreme market conditions. The default fund, furthermore, is generally a loss-sharing mechanism among the remaining participants. A CCP’s rules typically allow it to use all amounts in the default fund contributed by other participants to cover close-out losses that exceed a defaulted participant’s own margin and default-fund contribution. A CCP not contributing to another CCP’s default fund avoids contagion risk because the CCP will not need to participate in such loss-sharing.

It is possible to create a default fund arrangement for linked CCPs in which each interoperating CCP, rather than share in the loss of another, makes its own default fund more robust. The amount held should be sufficient to include close-out losses from an interoperating CCP that has not posted margin. The amount of default fund required would be calculated by a CCP using its own risk management methodology and collected from its own participants so that there is no liquidity demand on interoperating CCPs. Since neither margin nor any part of the enlarged default fund would be passed to interoperating CCPs, there is no re-use of participant collateral and the liquidity risk of inter-CCP margin exchange is avoided.

Continuous regulatory monitoring of the adequacy of the augmented default funds does not differ from regulators’ current supervisory objectives for CCPs and would ensure a uniform and safe process across CCPs. This solution would require little structural change to the industry, thereby delivering robust results relatively quickly. Moreover, it seems reasonable to pass the cost of augmenting default funds to cover this potential exposure on to the CCP’s participants, which would benefit from the reduced clearing costs and

increased margin efficiencies resulting from the ability to choose a CCP through interoperability.⁷

4.4. MINIMISE INTER-CCP OBLIGATIONS THROUGH INTER-CCP NETTING

When multiple CCPs interoperate, it is possible to reduce the amount of obligations they have towards each other by netting the inter-CCP obligations, thereby reducing their liquidity and settlement risks.

Figure 2 shows how an inter-CCP netting process could reduce inter-CCP obligations. Inter-CCP netting would require a netting agent. Each CCP would send its inter-CCP obligations to the netting agent after having run its own netting but before sending settlement obligations to the CSDs. The netting agent would then determine each CCP's net securities and cash positions against the other CCPs. The net position would be used for settlement among the CCPs and for calculating inter-CCP risk management obligations.

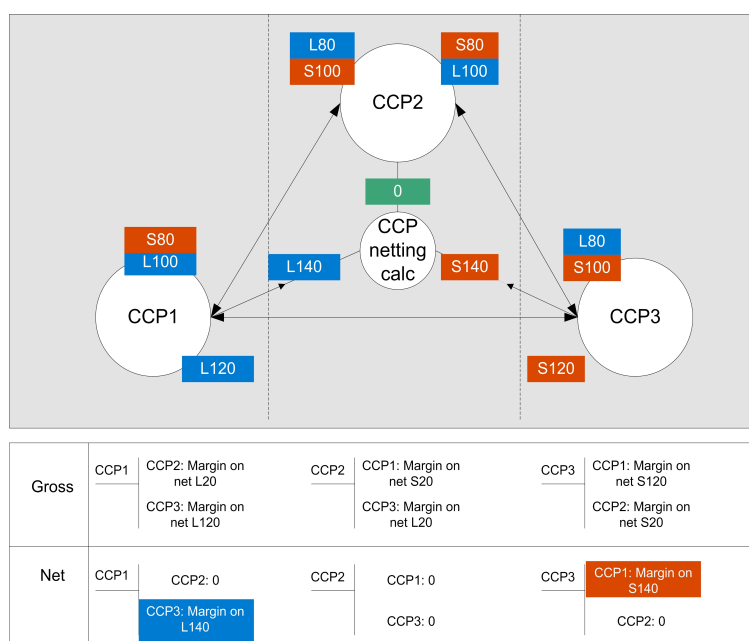


Figure 2 – Inter-CCP netting

This model presents challenges, however: it would take time to build and gain agreement on a common netting agent. Establishing the legal framework to enforce a netting agent model across jurisdictions could also be time-consuming. And this “CCP of CCPs” could be construed as a step towards a

⁷ An alternative to each CCP augmenting its own default fund is to create a market-wide inter-CCP reserve fund to cover close-out losses due to the default of any interoperating CCP. A market-wide reserve fund could be built up, for example, by a continuous levy on all CCPs’ participants. However, any such proposal is likely to be controversial, difficult to establish and take a period of time for adequate funds to build up. A CCP’s augmenting its own default fund achieves a similar result much more simply and less controversially.

singular CCP for the marketplace, although that is not the intention of such a construct. However, as a long-term solution, it has considerable benefits in a competitive environment and could efficiently provide regulators an overall picture of inter-CCP obligations whenever needed, via the netting agent.

4.5. ADDITIONAL PROTECTIONS AND CONSIDERATIONS

When a CCP exhausts all available financial resources and becomes insolvent, its remaining participants will be exposed to replacement-cost risk on their open positions and could suffer significant financial loss because a CCP failure is most likely to occur during extreme market conditions. An interoperating CCP likewise could be financially impaired if margin or inter-CCP default fund contribution from the failed CCP is insufficient to cover close-out losses. Such losses weaken the financial condition of the remaining CCP and in extreme scenarios could cause it also to become insolvent. At present, excess close-out losses are shouldered by the participants of the remaining CCP and/or its shareholders, even though the root cause could be the failed CCP's inadequate disclosure of its risk profile to the interoperating CCP, thus undermining proper risk management. Since interoperability is widely supported as essential to introduce competition for the benefit of the entire market, it is reasonable for the trading and clearing community to take responsibility for its ultimate security and collectively prevent contagion.⁸ In addition to the options discussed previously, the following are some additional proposals that would assist in mitigating these risks.

a. Reduce credit risk through the transparency of an Interoperability Convention

As soon as practicable, interoperating CCPs should replace confidential bilateral agreements with an Interoperability Convention or similar public agreement that allows all interoperating CCPs, regulators, market participants and trading venues to see how the exposures are managed and enumerates the rights and obligations of interoperating CCPs when there is a participant or CCP default.

Harmonising the management of inter-CCP exposures through a single, public set of principles eliminates potential contractual imbalances and makes inter-CCP risks transparent to participants. It therefore decreases the level of systemic risk and increases the level of market confidence. A single agreement removes the potential legal risk that, in the event of default, the same principles in different agreements could be interpreted differently by the parties themselves and/or by administrators. A consistent approach to

⁸The 2008 financial crisis highlighted the moral hazard problems that arise when risks are transferred but mispriced.

management of inter-CCP exposures does not require CCPs to harmonise risk management: each CCP maintains unchanged its own participant requirements, margining methodology, rulebook, close-out options and liquidation strategies in the event of a default.

b. CCPs share residual resources post close-out

In the United States, some securities clearing agencies are party to a multilateral netting agreement whereby excess margin resources from a defaulting participant held by a CCP after close-out are made available to the other CCPs that have incurred a close-out loss on the same participant. (This agreement is referred to as a “cross-guarantee” or “cross-margining” agreement, and limits the amount to be shared to whatever excess margin remains from the defaulting common participant following close-out.) This concept could be transported to Europe and would be beneficial even in the absence of interoperability as an additional risk mitigant, although the multi-jurisdictional nature of Europe could make it legally complex to ensure enforceability under applicable insolvency laws without regulatory or legislative support. The arrangements in the United States are included under each participating CCP’s rules as additional participant obligations to be satisfied under its respective default rules. One other concern that must be closely monitored by regulators is a situation where a CCP lowers its margin as a competitive weapon and looks to rely upon the aggregate excess collateral held by other, more properly margining CCPs.

5. COMMERCIAL BARRIERS TO INTEROPERABILITY MUST BE REMOVED

Finally, of the three major barriers to interoperability – competition, risk, and regulations – the biggest is the commercial aspect inherent in competition. It is unnatural for a CCP to volunteer to share its market with competitors. The more protected a CCP’s market position, the less willing a CCP is to collaborate with other CCPs to achieve full interoperability. The commercial interests of trading venues to favour certain CCPs and withhold trade feeds to others also impede interoperability from delivering the real benefits of competition to market participants. Although addressing risk management is important to make interoperability safe, the investment required is excessive if the market participants that ultimately pay cannot have free choice because commercial barriers are allowed to prevent full and effective competition among CCPs. The removal of the commercial barriers is likely to require

legislative intervention. The voluntary Code of Conduct has so far achieved limited success and resulted in patchy interoperability. Market participants must still connect to CCPs chosen for them by the trading venues and consequently may incur higher operating and margin costs than if they could freely choose the CCPs they prefer to use.

6. CONCLUSION AND RECOMMENDATIONS

Provisions in the Guideline are probably insufficient to prevent liquidity and credit risks arising from interoperability. The lessons learnt in the financial crisis and the recent concerns expressed by regulatory authorities about the potential impact of multiple CCP links should lead to a re-examination of the adequacy of link agreements already in place.

In stressed market conditions that may include significant intra-day as well as daily price fluctuations, inter-CCP margin exchange could generate excessive liquidity needs for CCPs. As a result, interoperability based on margin exchange would likely be untenable.

Liquidity risk could be substantially reduced by inter-CCP netting, but such an approach is not a realistic near-term option. Bank guarantees can reduce liquidity pressure, but a bank could fall into administration during extreme market conditions or additional credit might not be available when needed to increase the amount of obligations covered by the guarantee.

Alternative solutions that can avoid liquidity risk and ensure adequate protection against credit risk therefore need to be considered. We have four main recommendations:

- 1. Use an augmented default fund to cover interoperability.** In lieu of requiring CCPs to provide margin to each other, each interoperating CCP should consider augmenting its existing default fund by an amount designed to include the exposure to its CCP counterparties in extreme but plausible conditions. This practice would include the credit exposure of the CCPs, but avoid exposing the CCPs to the additional liquidity risk entailed by margin exchange. This approach offers additional benefits: it would provide increased transparency to market participants, improving their ability to manage risk; it would enable default fund contributions to be spread amongst many participants; and it would remove regulatory concerns about potential systemic risk arising from bank guarantees.

2. An Interoperability Convention should be quickly implemented.

Transparency and harmonisation of inter-CCP exposure management through an Interoperability Convention are critical to ensure interoperating CCPs are not exposed to unexpected risks arising from the other CCPs' links. Such a Convention would also ensure that, in the event of a default, CCP procedures to handle the problem are clear to all stakeholders. Transparency can be provided in the short term by requiring that CCPs disclose how key exposures are currently managed in any existing confidential bilateral link agreements. As soon as practicable, interoperating CCPs should replace confidential bilateral agreements with a single, public Interoperability Convention for clearing in the equity markets.

3 Commercial barriers to interoperability should be removed. The investment required to create interoperability will not pay off if interoperability is not universally adopted and market participants cannot freely choose their CCPs.

4 An inter-CCP netting process should be considered as a long-term approach to the need to minimise inter-CCP obligations. While it would take time to reach agreement on a "CCP of CCPs" process, this approach could reduce liquidity and settlement risk by applying the methodology CCPs employ in their daily operations.

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