Central Counterparty Interoperability

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Many securities and derivatives markets, including most that are traded on an exchange, are served by a central counterparty (CCP). After trades are executed, the CCP inserts itself between both trading counterparties, to protect them from the risk that one defaults before the obligations are settled. CCP interoperability is an arrangement that links different CCPs, allowing participants of one CCP to seamlessly deal with participants of another CCP. This can make it cheaper for traders to participate in a wider range of financial markets, and can facilitate competition between CCPs by opening up participant networks. However, interoperability also introduces financial stability risks, primarily by creating dependencies between the linked CCPs, and so it may be unsuitable for some markets. Interoperability arrangements are currently in place between some CCPs serving European equity markets, and another type of arrangement is in place linking several US CCPs. There are currently no links involving Australian CCPs, although the evolving CCP landscape may encourage links of some form in the future.

Introduction

Over the past decade, the landscape for financial market infrastructure has undergone considerable change, driven by the combined forces of technological advance, globalisation and regulatory change. National markets are commonly no longer served by a single infrastructure provider at all the stages of the trading process between execution and settlement. Emerging in its place is a more fluid environment in which infrastructure providers are targeting specific stages of the trading process, and increasingly operating across national borders.[1] Particularly in Europe, cases are emerging of CCPs competing directly with each other, especially to process trades executed on newly established trading platforms.[2] Partly in response, CCPs are expanding their scope and coverage, through new services, consolidation with other providers, and diversification into over-the-counter (OTC) derivatives markets.

In adjusting to these developments, market participants are placing new demands on CCPs and other post-trade infrastructure providers. For instance, traders that are active on multiple trading platforms would prefer to consolidate their clearing activities, rather than incur the cost of connecting to and maintaining memberships in multiple CCPs. One solution that has emerged is linking CCPs by making them interoperable. In Europe, this has helped integrate markets that are served by different CCPs. In the United States, alternative forms of CCP links have lowered the costs of connecting to multiple CCPs.

An interoperability link between two CCPs allows a participant of one CCP to carry out centrally cleared trades with a participant of the other CCP. By doing so, it lowers the cost to traders of expanding their product range and their access to trading networks. In particular, interoperability preserves the netting benefit to participants of using a single clearing

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1 Implications of changes to the international CCP industry structure are discussed in CPSS (2010).

2 CCPs are entities that specialise in financial market clearing. Clearing is the stage in the trading process between trade execution, which is often carried out on an exchange, and settlement, which involves the final transfer of products and cash. The role of CCPs is discussed in more detail later in this article.

venue, that is, the benefit of having incoming and outgoing obligations from different trades cancel each other, and allows participants to avoid duplicating CCP membership fees, default fund contributions and other participation requirements. As well as lowering the costs of participants' market access, interoperability also helps to foster competition between CCPs, including by facilitating market entry.

Notwithstanding the potential benefits, however, CCP interoperability may also be a source of systemic risk, primarily by introducing a channel through which stress can be transmitted between CCPs. Depending on the characteristics of the underlying markets, the costs of managing these risks – to market participants, CCPs and the financial system more broadly – may outweigh the benefits. For this reason, to date interoperability has largely been limited to equity markets.

These trends in the international environment for financial market infrastructure could potentially have implications for Australian markets. Most notably, the emergence of competition at the trading level in the Australian equity market has raised the prospect of competition emerging in clearing.[3] Demand for interoperability might then emerge. In addition, cross margining, another form of CCP link that permits participants to net obligations across different markets, is planned to be introduced between the two Australian CCPs (ASX Clear and ASX Clear (Futures)) in the coming years.[4] This article discusses how interoperability and other types of links between CCPs operate, and considers their implications.

The Role of Central Counterparties

After negotiating the terms of a financial trade, traders maintain an obligation to each other – to meet the negotiated terms – until settlement is effected through the final transfer of cash and, where applicable, products such as securities. These obligations create a counterparty credit exposure between the traders, because if market values change and one party defaults, the other party may incur a loss in replacing the trade. To manage this 'replacement cost' risk, traders can monitor the financial health of their trading counterparties, request collateral to cover the exposure, and institute a reliable settlement process.

CCPs, by definition, act as central counterparties to all trades in a given market. This occurs through a process known as 'novation', whereby the contract between the original parties to a trade is replaced by two contracts: one between the buyer and the CCP; and one between the seller and the CCP. This protects each trader should the other default, because the CCP undertakes to honour a defaulting trader's obligations. In this way, CCPs also facilitate anonymous trading. Before a trade can be novated to a CCP, however, both trading parties must first become participants of the CCP, or make arrangements with agents that are participants. Participation binds the CCP and each of its counterparties to the CCP's rules, which typically set out the terms of novation and require participants to fulfil certain financial obligations and other ongoing conditions.

Novation only occurs after the traders have agreed on the terms of the trade. These negotiations typically take place according to the protocols of an organised trading facility, in which case the original counterparties may remain anonymous to each other. In markets served by a trading facility, the trading facility and CCP will commonly have an arrangement whereby novation occurs at the moment the trade occurs, sometimes referred to as 'open offer'. With CCPs increasingly extending their coverage to standardised OTC markets, however, traders may choose to negotiate bilaterally and then submit details of the trade to the CCP for novation – provided the trade meets the CCP's specified novation criteria.

3 This is discussed in CFR (2012).

4 These two CCPs are subsidiaries of ASX Limited. Both clear a range of products; in particular, ASX Clear serves Australian equities markets, and ASX Clear (Futures) serves Australian futures markets.

CCPs provide three main risk-reduction benefits to their participants and the financial system more broadly:

- First, shifting a market to CCP clearing replaces a potentially complex network of bilateral counterparty exposures with a single set of exposures in that market. This is advantageous because bilateral counterparty exposures are typically not only costly to manage, but also a potential source of interconnectedness and systemic risk.
- Second, a CCP typically maintains a comprehensive, conservative and transparent risk-management framework. It is critical that a CCP is subject to exacting risk-management standards that are overseen rigorously, since an unavoidable by-product of replacing a bilateral network with a CCP is a concentration of counterparty risk and widespread operational dependence on the CCP.[5]
- Third, channelling all trades through a CCP allows multilateral netting, whereby each participant's incoming and outgoing obligations from different trades are netted down to a single net credit or debit for cash settlement, and a single net credit or debit for each security traded. This lowers aggregate exposures in the market, and reduces the liquidity that participants need to meet settlement obligations.

A typical CCP risk-management framework involves three layers of protection against participant defaults:

- *Participation requirements and participant monitoring*. This involves enforcing requirements related to participants' good standing, and closely monitoring their financial health. It also allows the CCP to place restrictions on participants' trading activities if need be.
- *Margin requirements*. This involves requesting collateral from participants in the form of an initial and variation margin, on at least a daily basis. The initial margin covers the CCP against potential future exposures to participants, with each requirement calibrated to cover a pre-specified confidence level (typically 99 per cent or higher, based on historical prices over an appropriate time horizon) of potential adverse value changes in the participant's current portfolio. The variation margin (also known as mark-to-market margin) covers the CCP against portfolio losses that have already occurred, limiting the coverage that is required from initial margin to any price movements since the last variation margin call.
- *Additional default resources*. This may be used should default losses exceed margin held. These often include a mix of CCP capital and participant contributions to a mutualised default fund.

The Mechanics of Interoperability

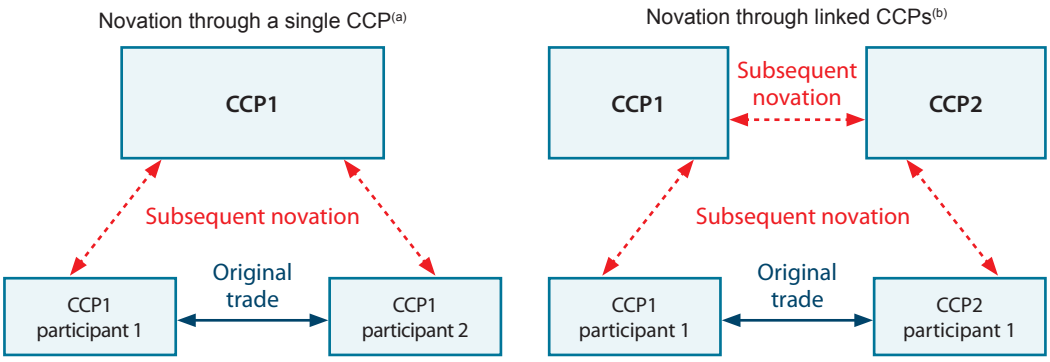
Interoperability facilitates novated trades between market participants that maintain clearing arrangements with different CCPs. To achieve this, a *link* is established between the two CCPs: the original trade contract is novated into three contracts, rather than two as occurs when a trade takes place between participants of the same CCP (Figure 1). The three contracts are between:

- the buyer and its CCP;
- the two CCPs; and
- the seller and its CCP.

Accordingly, each CCP provides a guarantee to the other that its side of the trade will be fulfilled; and each CCP provides a guarantee to its participant in relation to the performance of the other CCP.

5 Licensed clearing and settlement facilities in Australia are required to meet conditions set out in the *Financial Stability Standards*, available at <http://www.rba.gov.au/payments-system/clearing-settlement/standards/index.html>. The 2010/11 Assessment of licensed facilities against the *Financial Stability Standards* is available at <http://www.rba.gov.au/payments-system/clearing-settlement/compliance-reports/2010-2011/index.html>. Also, the international standards for financial market infrastructure risk management have recently been updated (and include a section on links between CCPs); see CPSS-IOSCO (2012).

Figure 1: Central Clearing with and without Interoperability



(a) Illustrates a trade being novated through a single CCP – after the trade occurs, the CCP transforms the original trade contract into two contracts, one between it and each participant; both participants must be members of the same CCP, as it is necessary to have continuity in the obligations that flow from one side of the trade to the other

(b) Illustrates a trade being novated through a CCP link (the link permits the CCPs to hold trading obligations to each other) – after a trade occurs between participants of separate CCPs, the trade is novated into three contracts, between each participant and its CCP and between the two CCPs; trades that occur between participants of the same CCP take place as they would without the CCP link, i.e. as in the left-hand side diagram

Source: RBA

Benefits

The particular benefits of interoperability depend on the characteristics of the markets for which the link operates. In the case of multiple CCPs serving markets for the same product, interoperability can improve competitiveness, and lower the cost to participants of being able to trade that product in all available markets. Establishing links between CCPs can also broaden market access, if CCPs initially service different products and then expand into each other's markets, and/or facilitate capital flows, if CCPs link up across different geographical regions.

Links between CCPs that clear the same product, but perhaps cover different traders and venues, essentially give participants synthetic access to other CCPs. This allows access to multiple CCPs' participant networks without the costs of maintaining multiple CCP memberships. These costs include membership fees, complying with participation requirements, meeting financial and other obligations, and maintaining technical connections. By allowing participants to hold all their positions in a single CCP, a link also avoids the loss of netting that would otherwise occur when trades are made across multiple clearing venues. Further, in jurisdictions with 'best execution' trading requirements, such as Australia, financial institutions trading on behalf of clients may in some instances require access to all trading facilities for a particular product, to guarantee that clients trading that product obtain the best terms available. In the absence of interoperability, this would also require these institutions to be able to clear through all of the CCPs serving those facilities. Where participants are not required to access all trading facilities, the costs of maintaining multiple clearing arrangements could mean that participants will be active in only a subset of the trading facilities, leading to the fragmentation of market liquidity.

Interoperability also allows more than one CCP to concurrently serve the same trading facility. In the absence of a link, traders would need to check that they were using the same CCP before confirming a trade, potentially making it difficult to undertake anonymous trading (which is often a valued part of undertaking trading through exchanges and similar platforms). Interoperability therefore allows market participants to choose their preferred CCP while continuing to trade on multiple venues. This creates stronger incentives for CCPs to improve their services.

Providing for multiple CCPs to serve the same trading facility also lowers the barriers faced by a CCP entering an established market. In the absence of a link with the incumbent CCP, an entering CCP would need to persuade the trading facility to switch from the incumbent, which would be likely to involve substantial switching costs. It should be noted, however, that unless both CCPs are already equivalently configured for interoperability, the link itself could involve significant costs to set up. This is because any link requires the CCPs to harmonise important aspects of their rules and procedures. Further, an incumbent CCP may be unwilling to compromise its monopoly position by entering into a link unless required to do so by regulation.

Finally, interoperability can also support the expansion of CCPs' product offerings, by facilitating market entry. Forming a link may present a more compelling case for a CCP to expand into products cleared by another CCP, since the link brings with it an established network of traders. Incentives to form such an arrangement are likely to be strongest where each CCP simultaneously agrees to clear the other's products – which may be similar products traded in different countries or regions – allowing both CCPs to offer their customers a wider range of products. For participants, this may lower the cost of accessing additional markets.

Risks and costs

Notwithstanding these benefits, interoperability may entail material costs which may make interoperability unsuitable for some markets. The costs relate primarily to potential financial stability risks associated with the exposures generated between linked CCPs and the costs involved in managing these risks. Since derivatives exposures typically have a much longer duration than securities exposures, the costs of interoperability are likely to be higher in derivatives markets.

The most significant component of these financial stability risks comes from the credit exposure each CCP assumes on the other. At any point in time, this amounts to the net value of all open trading positions across the link. Where a market is served by a trading facility, it is difficult for linked CCPs to regulate the scale of this exposure, since open-offer agreements require the CCP to novate all eligible trades that take place on the facility. Furthermore, whereas the credit risk associated with a participant can be actively managed, CCPs typically have less influence and information-collecting power over other CCPs, particularly those with which they compete.

This inter-CCP credit exposure could crystallise into losses if one of the CCPs were to fail, which would most likely be the result of the failure of one or more of that CCP's participants. This has a very low likelihood of occurring, since it would typically require that one or more participants defaulted with sufficiently large exposures, and in market conditions so extreme, as to create losses that exceeded all of the defaulting participants' collateral posted, plus the CCP's entire mutualised default fund.[6] However, if this did occur, the defaulting CCP's failed obligation to a linked CCP could be very large, because the number of trades cleared across the link could feasibly comprise a large proportion of the market. This could in turn threaten the solvency of the linked CCP, causing significant disruption to the financial system.

It is therefore important that any inter-CCP exposures are carefully managed. To achieve this, linked CCPs can provide sufficient collateral to each other to deliver a high degree of confidence that any default by a linked CCP would be covered without financial loss to the surviving CCP. In this case, collateral to cover inter-CCP exposures needs to be in addition to that collected by the CCP to cover direct exposures to its own participants, since it is conceivable that a linked CCP and a direct participant could default at the same time. Further, given that the magnitude

6 Clearing participant defaults are typically rare events, and most do not exceed the level of the defaulting participant's posted collateral. The only participant defaults at the Australian Securities Exchange CCPs have been those of the MF Global subsidiaries in late 2011. The collateral that the Australian CCPs were holding from these participants was well in excess of the losses on their defaulted positions.

of the inter-CCP exposure can change substantially from day to day, the collateralisation framework needs to be sufficiently flexible to ensure that any under-collateralisation is quickly remedied and that the collateral can always be sourced before its payment is due to the other CCP. One way to achieve this is for CCPs to collect the collateral from their participants by adding an extra component to their daily margin calls, based on the volume of trades flowing across the link. In this case, CCP interoperability can potentially increase participants' collateral requirements relative to participating separately in two CCPs.

Interoperability may also introduce operational and legal risks, particularly if the linked CCPs operate in different regions. Operational risks result from the linked CCPs becoming dependent on each other's systems; for example, system problems at one CCP that temporarily prevent it from processing cleared transactions could create significant uncertainty for the operations of a linked CCP. Legal risks are particularly relevant where the CCPs operate under different legal frameworks, in which differences in laws could create uncertainty in areas such as settlement finality, novation and multilateral netting. The recently published report CPSS-IOSCO (2012) 'Principles for Financial Market Infrastructures' outlines the various types of risk introduced by CCP interoperability and sets out international risk-management standards.

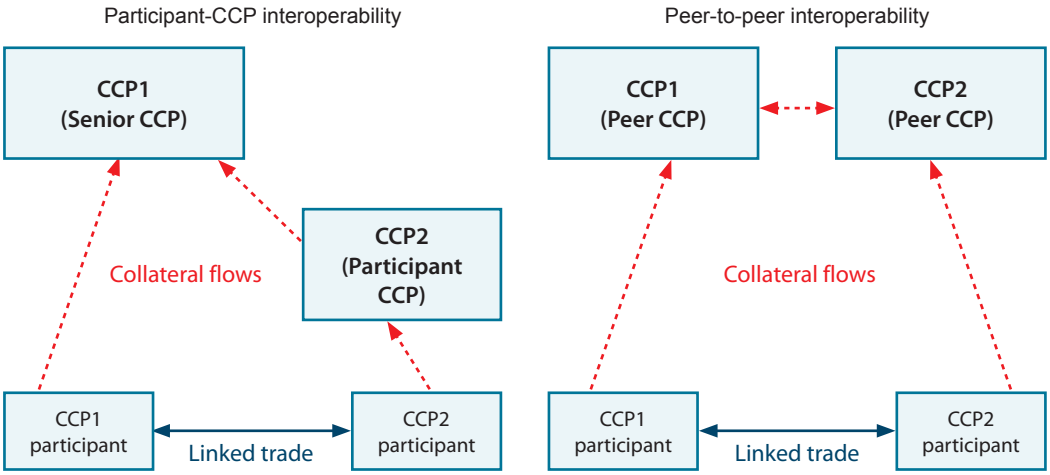
The magnitude of risk introduced by an interoperability link would be expected to be much greater for a derivatives market than a securities market, owing primarily to the longer duration of their exposures. Securities markets are typically settled around three days after negotiation, which limits the inter-CCP obligation to trades that have occurred in the past three days. Derivatives positions, on the other hand, can have durations of up to several years, resulting in significantly greater accumulation of open positions and exposures.

Interoperability models

Interoperability arrangements are commonly classified according to the symmetry of the risk-management requirements and of the CCPs' access to trade feeds. For instance, a CCP link may be set up either as a 'participant' link, or as a 'peer-to-peer' link (Figure 2):

- A *participant* link involves one CCP becoming a participant of the other, without a reciprocal arrangement. The participant CCP therefore provides collateral to the other CCP, but not vice versa. To protect itself from a default by the

Figure 2: Alternative Models of CCP Interoperability



Source: RBA

linked CCP, a participant CCP would have to make arrangements for additional default resources from elsewhere. A participant link is more likely to be established where the participant CCP has stronger incentives to establish a link than the CCP to which it is linking.

- A *peer-to-peer* link involves each CCP becoming a participant of the other, with collateral flowing in both directions (i.e. each linked CCP providing collateral to the other). The CCPs would likely have different participant obligations placed on them than regular participants; this would typically exempt the linked CCP from loss-sharing arrangements with other participants (e.g. contributions to a mutualised default fund), to reduce the direct exposures between each CCP and the other CCP's participants.

Where linked CCPs serve one or more trading facilities, the link can also be distinguished by how the trade feeds are received by the CCPs. For instance, information on trades novated through open offer could come directly from the trading facility, or indirectly through the linked CCP. The receipt of information via the linked CCP constitutes an additional source of operational dependence on the providing CCP. Accordingly, such an arrangement would be more likely to be observed in a participant link arrangement, or in the case in which the link involves the receiving CCP entering a market previously served only by the providing CCP.

The European Experience

To date, interoperability has predominantly been a European phenomenon, reflecting an effort in the European Union (EU) to foster a more integrated financial market. Market participants and regulators have encouraged interoperability as a way of lowering the costs to participants in accessing the markets served by CCPs across EU countries, which otherwise often required the use of multiple nationally oriented intermediaries. The European experience helps to illustrate the forces that led to the implementation of the existing links, and some of the impediments to their establishment.

Interoperability links and oversight

A small number of interoperability links were set up in Europe around 2003. The most prominent of these was the link between LCH.Clearnet Ltd and SIX x-clear, that currently serves two major European equities markets. It was established in 2003 to allow both CCPs to clear equities traded on the SIX Swiss Exchange. SIX x-clear initially operated as a participant CCP, although in 2008 the CCPs negotiated a peer-to-peer arrangement, and later that year the link expanded to also cover equities traded on the London Stock Exchange.

In a 2009 regulatory assessment of SIX x-clear, the Swiss National Bank and the Swiss Financial Market Supervisory Authority noted that the number of inter-CCP positions had grown significantly and had left SIX x-clear with an excessive exposure to LCH.Clearnet Ltd (SNB and FINMA 2009). The report noted that around half of the (clearing-eligible) trades on the Swiss trading facility and most trades on the London Stock Exchange were being cleared through the link, and that the collateral provided by LCH.Clearnet Ltd to SIX x-clear was no longer adequate. In 2011, SIX x-clear announced a new arrangement for collateralising inter-CCP exposures that met regulatory expectations.

The growth of newer electronic trading platforms has seen an expansion in interoperability arrangements. In particular, the entry of Chi-X Europe and BATS Europe, in 2007 and 2008, respectively, has led to the establishment of what is now a four-way link, involving European Multilateral Clearing Facility, LCH.Clearnet Ltd, SIX x-clear and EuroCCP.

Regulatory responses

Around the time that earlier links were being established, market users and regulators were calling for greater interoperability as a means of lowering the costs of cross-border access to EU financial markets. However, CCPs generally had little incentive to establish links that would open their markets to competitors. In response, regulators threatened legal reforms to mandate open access between CCPs. In

2006, this resulted in a large portion of the European CCP industry signing a Code of Conduct to establish links with other signatories upon request.

After this agreement was signed, a large number of applications were made by CCPs requesting links to other CCPs. However, since the Code was essentially voluntary, it proved difficult to enforce, particularly when some CCPs receiving applications cited technical difficulties in establishing the requested links. Notwithstanding this, given the large number of applications, regulators in the United Kingdom, Switzerland and the Netherlands put a halt to further link formation in their jurisdictions, pending assessment of the implications for risk of the complex network of CCPs that could result. These regulators subsequently set out a number of risk-management conditions for new link arrangements.

While this has led to the establishment of some new links, they have mostly involved start-up trading facilities and CCPs, rather than incumbent CCPs opening access to their markets. To promote further integration of national exchanges and their CCPs, the European Commission is currently working on strengthening CCPs' obligations to establish links for securities markets. These obligations, which will be legally enforceable, will be put in place over the next two years. Work on interoperability in derivatives markets has been postponed pending further review, which European regulators have commissioned to take place by the end of 2014.

Other Forms of CCP Links

Internationally, two other types of CCP links have emerged that are more straightforward to implement than full interoperability, though they can generate similar risks. One is cross-margining arrangements, which involve two CCPs combining parts of their risk-management arrangements to be able to grant offsets or discounts on collateral requirements to participants that use both CCPs concurrently. The other is mutual offset arrangements, which permit participants to transfer positions from one CCP to another, to facilitate trading across different time zones.

Cross margining

Cross margining refers to a margin discounting regime for participants that hold negatively correlated contracts across different CCPs.[7] These could include, for example, a short futures position and a long call-option position that reference the same underlying price. The negative correlation means that the expected price variance – which estimates the risk of adverse price movements – of the set of both contracts is notably less than that of the contracts considered separately. If both positions were held at the same CCP, the CCP would typically acknowledge this reduced risk by giving a discount on the initial margin requirements; cross margining extends this practice to contracts held across different CCPs.

To achieve this, the CCPs share information on participant positions, and cooperatively calculate discounted initial margin requirements for each cross-margined portfolio. Should a cross-margined participant default, which would likely leave gains at one CCP and losses at the other, the two CCPs share the gains and losses on that participant's cross-margined positions, and the participant's collateral.[8] This creates an exposure between the CCPs, because each CCP faces the risk that the other CCP defaults at the same time as a cross-margined participant. In this situation, if the surviving CCP suffered losses on the cross-margined positions, it could potentially have insufficient collateral to cover them.

Some cross-margining arrangements also extend the cross-CCP exposure netting functionality to variation margin payment obligations. This allows participants to make one net margin payment for

7 Cross margining sometimes also refers to margin discounts that are offered across products within a single CCP. This article specifically refers to cross margining across different CCPs.

8 Cross-margining links typically involve a cross-guarantee agreement that creates legal obligations for how the CCPs will share gains, losses and collateral should a cross-margined participant default. As bankruptcy laws typically impose restrictions in these areas, the ability or difficulty of instituting a cross-margining arrangement will likely depend on the broader legal framework in that jurisdiction.

obligations to both CCPs, which can significantly lower payment requirements; for instance, where a participant has made losses on positions held at one CCP and gains on positions held at the other CCP. However, such an arrangement typically involves the CCPs holding joint accounts into which participants can make their variation margin payments for cross-margined positions, which creates a continuous dependence between the CCPs. In contrast, under cross-margining arrangements that only allow initial margin netting and do not involve joint accounts, inter-CCP exposures only arise if a cross-margined participant defaults; if this occurs, the potential losses are limited to losses relating to the defaulting participant's cross-margined positions.

Cross margining is most common in the United States. US CCPs with cross-margining arrangements include CME Clearing (a derivatives CCP owned by CME), Fixed Income Clearing Corporation (owned by DTCC), Options Clearing Corporation, New York Portfolio Clearing and ICE Clear US; the arrangements cover futures, options and fixed income products. An international cross-margining arrangement was set up for short-term interest rate contracts between CME Clearing and LCH.Clearnet Ltd in 2000, which the CCPs terminated in 2010 citing increased maintenance costs. More recently, LCH.Clearnet Ltd, Fixed Income Clearing Corporation and New York Portfolio Clearing have announced intentions to set up an arrangement that will cover several major markets in both the United States and the United Kingdom.

Mutual offset

Mutual offset arrangements permit participants to establish a derivatives position at one CCP and close it at another. This allows a participant to trade the same position across markets, for instance across time zones. In doing so, inter-CCP exposures are created, since the CCPs must offset each transferred position with an opposite position between themselves. A mutual offset arrangement is currently in place between CME and SGX (Singapore), covering futures contracts.

The Australian Context

Although there are currently no CCP links in place in Australia, the international clearing landscape is evolving rapidly and there are several areas in which Australian stakeholders may consider CCP links as a source of efficiencies. These could include, for example: alleviating market fragmentation if competition in clearing emerges in the Australian equity market; making more efficient use of collateral across Australian CCPs (particularly if central clearing services were expanded to OTC derivatives markets); and improving access to overseas markets.

If any CCPs were to establish competition with existing Australian CCPs, market participants might look to interoperability as a way to access all trading platforms while maintaining a clearing relationship with only one CCP. Under the *Corporations Act 2001*, any interoperability arrangements between licensed clearing facilities would have to be consistent with the *Financial Stability Standard for Central Counterparties*, which would entail managing the resulting risks in accordance with regulatory expectations. In addition, since a link would be likely to affect the balance of market power, and involve substantial set up costs, it may also be necessary to establish regulatory standards around protocols for forming links.

An alternative way of forming links, cross margining, is more likely to arise between CCPs that serve different types of products. For instance, the two CCPs in the ASX Group – ASX Clear, which clears equities and options on equities, and ASX Clear (Futures), which clears futures and options on futures – plan to introduce cross margining as part of the current upgrade to their margining systems, although the plans for the link are still in early stages.[9] Furthermore, clearing of OTC derivatives may increase collateral costs of trading OTC products, which would raise the value of any collateral efficiencies that can be found; it would also widen the range of products

9 This is discussed in section 5 of RBA (2011) under 'Harmonisation and Linking of Central Counterparty Activity'.

being centrally cleared, introducing more contract combinations that could be cross margined. As with interoperability, any cross-margining arrangements would have to satisfy the *Financial Stability Standard for Central Counterparties*.

Finally, with the increasing globalisation of financial markets, it is possible that in the future a stronger trend will emerge towards international CCP links, either through interoperability, cross margining, mutual offset, or other innovations. Interoperability has already been considered as a means of reducing the potential for market fragmentation in OTC derivatives markets as multiple CCPs emerge in different countries.[10] However, since interoperability has so far been limited to less complex products, further work would be required to determine whether the risks introduced by CCP links for OTC derivative markets could be managed acceptably.

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10 For example, the use of CCP interoperability for OTC derivative markets has been discussed in CFR (2011), Slive, Wilkins and Witmer (2011) and CGFS (2011).