Central Clearing of OTC Derivatives in Australia

A discussion paper issued by the Council of Financial Regulators

JUNE 2011

ISBN 978-0-9871488-3-4 (Online)

Central Clearing of OTC Derivatives in Australia

A discussion paper issued by the Council of Financial Regulators

JUNE 2011

Contents

Executive Summary

The agencies of the Council of Financial Regulators are considering the question of central clearing of over-the-counter (OTC) derivatives transacted in Australian financial markets. This issue is one in which all Council agencies have an interest. To co-ordinate the development of recommendations to the Government, the agencies have issued this discussion paper as a basis for consultation with all interested stakeholders.

The impetus for issuing this discussion paper arises in part from the substantial reforms in this area underway in many offshore jurisdictions. Along with these international developments, the interests of the Australian agencies also reflect a commitment by the G20 group of countries (of which Australia is a member) to undertake significant reforms to the functioning of OTC derivatives markets. In particular, these countries committed to see all standardised OTC derivatives transactions centrally cleared by the end of 2012, as part of a package of several measures to strengthen OTC derivatives markets. The package also included measures to promote the use of trading platforms and trade reporting, and to increase capital requirements for uncleared transactions – the Council agencies are considering these matters separately, and will undertake consultations with interested stakeholders as appropriate.

A key aim of the international reform process underway is to harness the benefits of central counterparty (CCP) arrangements to increase the resilience of global financial markets – of which OTC derivatives markets are an important part – while also reducing the interconnectedness of major global banks that dominate many of these markets. To a large extent, these considerations are more relevant for Europe and the United States than they are for smaller markets such as Australia. Nonetheless, the Council agencies agree that central clearing could be of benefit for some parts of the Australian market. However, the agencies also note that the nature of CCPs is such that they can have significant effects on market structure and functioning, which should be taken into consideration if a move to central clearing in Australia were to occur. In particular, a CCP concentrates counterparty and operational risk to a substantial degree, introducing a different set of risks to that existing in bilateral markets. Furthermore, the design of a CCP necessitates some tiering in the relationships among intermediaries and other market participants, which may have wider implications for the efficiency and stability of the domestic market. Although central clearing has been a part of financial markets for many years, these arrangements have evolved organically, and the push for mandatory clearing in certain markets is a new development. Therefore, a significant challenge facing regulators in implementing a requirement for increased central clearing is to minimise any unintended consequences that this move might have for risks within domestic and global financial systems.

An analysis of available data on Australian OTC derivatives markets suggests that the products most actively traded by domestic market participants are interest rate and foreign exchange derivatives, and that it is likely that there would be some scope for central clearing of at least some of this activity. In considering whether domestic markets might be amenable to clearing, it is also important to note that the Australian market is

relatively small compared to the largest offshore markets, and that the composition of dealers in the local market is somewhat different to major offshore markets. Whereas activity in the largest offshore markets is highly concentrated among a fairly small group of global dealers, the Australian market (like many other regional markets) also has important participation from more locally or regionally focused institutions.

In thinking through these issues, the Council agencies have focused on four key considerations. The first is the availability of central clearing services to Australian-based market participants. There is currently no central clearing of OTC derivatives in Australia. Offshore clearing solutions, where they exist, are configured to suit the large European and US markets more so than for smaller markets such as Australia. At the same time, the global market for CCP services is currently undergoing considerable change, in response to a range of commercial and regulatory factors. This rapidly evolving global landscape for central clearing makes it difficult to foresee how clearing of the Australian OTC derivatives market might evolve.

Secondly, the Council agencies recognise the significance of the cross-border linkages that are a part of the Australian (and most other countries') OTC derivatives markets. The depth and efficiency of the domestic market are enhanced through local participants being able to transact with offshore counterparties, while domestic-based participants are in turn able to access offshore markets and products through the global presences of Australian and foreign intermediaries. At the same time, these close linkages mean that overseas market and regulatory developments are an important force in shaping the Australian market.

A third consideration is the implications that central clearing might have for financial stability. On the one hand, a CCP can enhance the resilience of a market, through a range of direct and indirect channels. These include reducing some interdependencies of market participants, as well as providing a centralised mechanism to assist in resolving participant defaults and other crisis management arrangements. On the other hand, there might be systemic risk implications if a greater concentration of exposures or dependencies among market participants resulted from a shift to centrally cleared arrangements. Of course, the greatest concentration of risk is with the CCP itself, thereby embedding the systemic importance of these facilities. Though risks can be mitigated through the efforts of CCP operators, market participants and regulators, they can never be eliminated. Given the central role of a CCP, any failure of a CCP would have serious consequences for financial markets. The management of a participant's default may also have significant implications for domestic market functioning. There may be an expectation or need for some involvement of domestic agencies in these situations.

Fourth, the configuration of CCPs could have important effects on the efficiency and functioning of a market. Fragmentation of clearing could see a reduction in netting opportunities and collateral efficiencies, which might raise costs to participants (and, indeed, increase exposures among participants). Overall costs in a market will also depend on the degree of competition among CCPs and market participants, as well as numerous other effects. However, the structure of intermediaries' local and global operations, the choice of markets they participate in, end-users' derivatives utilisation, and the scope and design of CCPs serving these markets are all determined endogenously to a significant extent.

These various considerations add to the complexity of assessing how central clearing might best be achieved in the Australian market. Use of large offshore CCPs might allow for greater efficiencies while also facilitating the cross-border nature of many OTC derivatives markets. On the other hand, risk and stability considerations point towards a domestic solution. In weighing these various factors, the Council agencies are also guided by the underlying objectives of the regulatory reform of global OTC derivatives markets, to increase the resilience of these markets and to reduce the degree of interconnectedness among participants.

Given this, the Council agencies suggest the following propositions regarding what might be the future path of central clearing of Australian OTC derivatives markets:

- In the absence of Australian regulatory action, domestic CCP solutions may not emerge. Hence decisions by regulators and participants in major overseas OTC derivatives markets may have the effect of inducing Australian-based market participants to use offshore CCPs for a significant part of their business. This might be the case even in the absence of any Australian clearing requirements.
- Where offshore CCPs are clearing domestic markets that are of systemic importance, this may introduce risks to the Australian financial system that do not currently exist. It is likely that Australian regulatory agencies would have less scope to oversee offshore CCPs relative to domestic ones, and to respond as needed in conditions of stress. For this, and other public policy reasons, the Council agencies have reservations about a mandatory clearing requirement that resulted in a systemically important domestic market being cleared though offshore CCPs.
- The Council agencies consider that the market for Australian dollar-denominated interest rate derivatives (such as overnight indexed swaps, forward rate agreements, and interest rate swaps) is systemically important within Australia, given the wide range of domestic participants that use these instruments, and the interdependencies between these derivatives markets and other domestic capital and credit markets.
- In light of this, the Council agencies are considering the case for a requirement that activity in Australian dollar-denominated interest rate derivatives be centrally cleared and whether this should take place domestically. A mandatory clearing requirement to that effect would generally apply to financial institutions acting in the domestic market (such as Authorised Deposit-taking Institutions and Australian Financial Services Licensees); the Council agencies would expect that some market participants would be exempt from this mandatory requirement, depending on their size or class.

The purpose of this discussion paper is to seek feedback on the Council agencies' views and propositions before making any recommendations to the Government on this matter. The agencies recognise that many of the issues are highly complex, and that not all stakeholders' interests may be aligned. The paper sets out a consultation process through which the perspectives of interested stakeholders can be taken into consideration.

1. Background

1.1. Introduction

In September 2009 the leaders of the G20 group of countries, of which Australia is a member, made a number of commitments regarding reforms to global financial markets. One of these was specifically focused on over-the-counter (OTC) derivatives markets:

> 'All standardized OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through central counterparties by end-2012 at the latest. OTC derivative contracts should be reported to trade repositories. Non-centrally cleared contracts should be subject to higher capital requirements. We ask the FSB [Financial Stability Board] and its relevant members to assess regularly implementation and whether it is sufficient to improve transparency in the derivatives markets, mitigate systemic risk, and protect against market abuse.'[1]

In the period since then, G20 members and other countries have begun reforming the regulation of OTC derivatives markets within their jurisdictions. Revised regulatory frameworks have been legislated or proposed in economies with large OTC derivatives markets, such as the European Union, Japan and the United States, while other jurisdictions have also begun moving. In parallel, revisions to associated standards and guidance have been undertaken by international standard-setting bodies, and the FSB has issued a set of recommendations for countries when implementing regulatory reforms for OTC derivatives.

The Australian Council of Financial Regulators – comprising senior representatives of the Australian Prudential Regulation Authority (APRA), the Australian Securities and Investments Commission (ASIC), the Reserve Bank of Australia and the Treasury – has been considering how the G20 commitment can be best implemented in Australia. The Council agencies' initial focus has been on how Australia should meet its G20 commitment in relation to the central clearing of OTC derivatives. The Council has also been considering other aspects of the G20 commitment, such as reporting to trade repositories, and will develop recommendations to the Government on these in due course.

1.2. Regulatory Concerns Regarding OTC Derivatives

The G20 commitment on OTC derivatives came in the wake of a severe global financial crisis, during which a significant source of uncertainty had been the functioning of some OTC derivatives markets.[2] Neither regulators nor market participants felt they had a good understanding of exposures and linkages within these markets.

1 Group of 20, Pittsburgh Summit Leaders' Statement, September 24–25 2009, available at: http://www.g20.org/Documents/pittsburgh_summit_leaders_statement_250909.pdf.

2 For a discussion of the interaction of wholesale financial markets, the roles of large dealers, and the difficulties this can pose in crisis situations, see Duffie (2010).

There was little confidence that available bilateral risk management tools had been utilised appropriately in all segments of the OTC derivatives markets, or had been effective in dealing with the stresses in the market. Moreover, the inherent interconnectedness of these markets meant that OTC derivatives were a prime channel through which distress in one institution or location could be transmitted to others.

Concerns over the lack of transparency and risk management shortcomings in some OTC derivatives markets had in fact been on regulators' minds for several years prior to the financial crisis. Unlike traditional exchange-traded derivatives contracts – which are highly standardised and typically of quite short duration – the long maturity and bespoke nature of many OTC derivatives transactions create a heavier risk management burden for participants in these markets. As well, cumbersome bilateral processes can mean that economically redundant positions contribute to a build up of large gross notional positions outstanding, further increasing interdependencies and complexities for market participants.

Regulators and industry participants had therefore periodically reviewed risk management practices as the market grew.[3] The past decade, though, saw accelerating product innovation and growth in volumes and exposures, particularly in the credit derivatives market. To discuss regulatory concerns, in 2005 the Federal Reserve Bank of New York began convening a series of meetings between regulators from the major markets and representatives of the largest globally active dealers. This process has led to a series of incremental improvements in risk mitigation practices for large dealers, particularly in the credit derivatives market. The process has also contributed to a wider international debate on these issues. In April 2008, the Financial Stability Forum, the predecessor of the FSB, released a report that included recommendations addressing the legal and operational infrastructure underpinning OTC derivatives markets.[4]

In response to this call, APRA, ASIC and the Reserve Bank undertook a survey of risk management and other practices in the OTC derivatives market in Australia, with a report published jointly in May 2009.[5]

The survey found that the overall level of activity in Australia, while large in a domestic context, was low relative to major offshore markets. Within the local market, trading was dominated by interest rate and foreign exchange (FX) derivatives, with only small amounts of activity in equity, commodity and credit derivatives. Moreover, the types of products and the nature of participants and their use of derivatives were fairly straightforward compared to some offshore markets.

Although no immediate concerns were identified, the regulators noted that there was some scope for improvements in market practices. It was noted that while a capacity to centrally clear positions transacted within the Australian market did not appear likely within the near future, the benefits of central clearing could be substantial, and therefore participants were encouraged to explore the potential for this as the local market grew and the range of CCP services expanded.

In the meantime, authorities in major markets were working through the consequences of the financial crisis, and considering how the resilience of their financial systems could be improved. An obvious candidate in this respect was to push for enhancements to the practices and infrastructure underpinning OTC derivatives markets, including steps to reduce the interconnectedness of participants. But given the cross-border nature of these markets – and particularly the prospect of regulatory arbitrage between jurisdictions – some international co-ordination of regulatory action was seen to be desirable. This was manifested in the G20 commitment.

3 See, for instance, CPSS (1998), Counterparty Risk Management Policy Group (2005) and CPSS (2007).
4 Financial Stability Forum (2008).
5 APRA, ASIC, and RBA (2009).

1.3. International Regulatory Reforms

1.3.1. National responses

Subsequent to this commitment, over the course of 2010 and into 2011 a number of countries have been developing substantial reform agendas for OTC derivatives markets within their jurisdictions. In most cases, though, national regulators are still at a very preliminary stage of developing policies.[6] Even in countries with a more advanced reform program, many details of implementation remain to be finalised, covering issues such as: the scope of regulators' jurisdiction over transactions and participants; how and when exemptions for any central clearing obligation will be granted; the definition and determination of product classes to which a clearing requirement will apply; and the co-ordination of regulatory oversight arrangements for globally significant CCPs clearing OTC derivatives.

Perhaps most prominently, in the United States the *Dodd-Frank Act*, passed in mid 2010, will require US-regulated entities to centrally clear all instruments that regulators have deemed to be clearable.[7] If a market participant is not a clearing participant of the relevant CCP, it must clear through an existing clearing participant. Proposed legislation in Europe (*European Markets Infrastructure Regulation*, or *EMIR*) will have similar effect, as does legislation enacted in Japan in early 2010.[8, 9]

Clearing requirements set out in these three large jurisdictions are similar in that they provide for both a 'top-down' and 'bottom-up' approach to determining whether a set of contracts will be required to be centrally cleared. Under the top-down approach, a relevant regulator within each jurisdiction has the authority to designate certain contracts as clearable, whether or not a CCP that can clear these products has been licensed within that jurisdiction. In part, the purpose of this approach is to overcome a possible failure of industry co-ordination to move to central clearing. The bottom-up approach, in contrast, allows for a more industry-led process, where authorities can designate a set of products as mandatorily clearable if and when a CCP has requested and been granted a licence to clear those products.

Although the requirement to centrally clear is designed to apply widely across market participants and products, in practice a more limited set of activity will be captured. Regulators have recognised that not all OTC derivatives products are amenable to central clearing, and that in some cases central clearing may not result in a material reduction in systemic risk. For instance, important classes of FX derivatives have been exempted from central clearing requirements in the United States, while complex or illiquid products are unlikely to be designated as clearable.[10] Given this, regulators are considering whether non-cleared derivatives will also be subject to minimum margin requirements, both to ensure that all derivative positions are adequately supported by financial resources, and to maintain participants' incentives to centrally clear transactions where possible. In addition, so as to maintain high levels of transparency (both for market participants and regulators) around non-centrally cleared transactions, regulators in the European Union and the United States are also requiring all OTC derivatives transactions to be reported to trade repositories.

As yet, US regulators are yet to make a detailed enumeration of clearable derivatives. Other jurisdictions are likely to harmonise their requirements with this so as to avoid regulatory arbitrage opportunities (indeed, the

6 For a report on the state of international reform in this area, see FSB (2011a).

7 The text of the *Dodd-Frank Act* is available at: http://www.gpo.gov/fdsys/pkg/PLAW-111publ203/pdf/PLAW-111publ203.pdf.

8 The draft *EMIR* legislation as proposed by the European Council as at 6 June 2011 is available at: http://register.consilium.europa.eu/pdf/en/11/st10/st11058.en11.pdf.

9 In May 2010 the Japanese Diet passed relevant amendments to the *Financial Instruments and Exchange Act*.

10 The US Treasury's decision regarding an exemption for certain FX derivatives is available at: http://www.treasury.gov/initiatives/wsr/Documents/FX%20Swaps%20and%20Forwards%20NPD.pdf.

FSB is attempting to achieve internationally co-ordinated outcomes on this as much as possible). In terms of for whom a clearing requirement will be mandatory, final exemptions are still being determined. In general, financial institutions (whether dealers or clients) will be required to centrally clear, while exemptions will exist for corporations that might be using products purely for hedging purposes, some government entities and other smaller market participants. There is some possibility that offshore jurisdictions' provisions will have an extraterritorial effect, though the extent of this is unclear at present.

In mandating central clearing for a wide range of market participants, legislators and regulators in the European Union and the United States have taken account of some of the risks posed by CCPs (discussed further in Section 2). Recognising the systemic importance of CCPs – and that this is likely to grow as a result of mandatory clearing requirements – stringent risk management frameworks for CCPs are being imposed in these jurisdictions. As well, the potential for a CCP to face financial difficulty (no matter how remote) has also been a factor in designing some elements of the regulatory frameworks. In the United States, for instance, Title VIII of the Dodd-Frank Act provides for financial market utilities such as CCPs to be designated as systemically important, increasing the oversight capacities and enforcement powers available to US regulators, and authorising the Federal Reserve to provide (limited and strictly controlled) support to CCPs in times of market emergencies. The European legislative proposal also acknowledges the potential for CCP distress; since the member state that is the home jurisdiction for such a CCP might bear prime fiscal responsibility in such a situation, EMIR provides that regulators in that jurisdiction are given lead responsibility in the CCP's supervision.[11] To provide additional protections to market participants that are being forced to clear transactions, but that may not be willing or able to join a CCP as a clearing member, legislation in these jurisdictions also seeks to enhance the portability and segregation of clients' collateral and positions in the event of a clearing member default. For these provisions to be fully effective, a number of jurisdictions will likely require changes to insolvency laws.

1.3.2. Multilateral responses

In parallel with these various national reform agendas, significant work has been undertaken in multilateral fora. The Basel Committee on Banking Supervision (BCBS) has been working on revisions to capital standards that should encourage banks to clear their OTC derivatives positions through CCPs.[12] The capital weighting on bilateral counterparty exposures will be increased, while exposures to a CCP will be afforded a weighting that is low (but non-zero). While some details of these arrangements are still to be finalised, banks with large or complex configurations of bilateral OTC derivatives exposures will likely have a strong incentive to move these to CCPs over time. In part reflecting the expanded role of CCPs, the Committee on Payment and Settlement Systems (CPSS) and the International Organization of Securities Commissions (IOSCO) have issued new principles to guide the oversight of infrastructure supporting these markets.[13]

An important context for Australian agencies in developing a reform agenda with respect to OTC derivatives is a set of recommendations issued by the FSB.[14] These recommendations focus on the areas of standardisation of products and practices, central clearing, exchange or electronic platform trading, and reporting to trade repositories. It is acknowledged that national authorities will need some flexibility in structuring their approach across these areas. The recommendations with respect to central clearing discuss: how to identify which products are amenable to central clearing (acknowledging that some products will inevitably remain on a bilateral basis); where clearing should be mandatory or voluntary; and where exemptions may be appropriate.

11 Draft *EMIR* preamble, paragraph (30).
12 BCBS (2010a).
13 CPSS-IOSCO (2011).
14 FSB (2010).

2. Central Clearing of OTC Derivatives

2.1. Introduction

Developments over recent years have seen the attention of many regulators focused on the potential risks arising from OTC derivatives: counterparty credit risk, operational risks, and the systemic consequences that a serious disruption might have, given the interconnectedness of many large financial institutions.

As noted in Section 1.2, APRA, ASIC and the Reserve Bank undertook a joint survey of risk management practices in the Australian OTC derivatives market in 2009. The survey found that the use of risk management tools within the Australian industry was broadly in line with international practice. However, as a result of the survey, the regulators made a number of recommendations, encouraging market participants to:

- promote market transparency;
- ensure continued progress in the timely negotiation of industry-standard legal documentation;
- expand the use of collateral to manage counterparty credit risks;
- expand the use of automated facilities for confirmations processing; and
- expand the use of multilateral portfolio compression and reconciliation tools.

The regulators also recommended that market participants should promote Australian access to central counterparties for OTC derivative products.

In dialogue with the Australian Financial Markets Association (AFMA), the regulators have continued to advocate improvements, and have been monitoring the domestic industry's progress with respect to these recommendations. The regulators have been encouraged by the steps that have been taken to date to improve bilateral risk management, and the regulators will continue to examine developments in this area. However, in many ways a move to central clearing could result in a significant advance in risk management as well as provide other benefits to markets. In particular, central clearing provides a focal point for market oversight and participant default management, which can enhance the resilience of financial markets. For these reasons, the Council agencies support a move to central clearing. It is acknowledged, though, that central clearing can bring a new set of risks, and that this trade-off needs to be carefully thought through.[15]

Determining suitable clearing arrangements for Australian OTC derivatives markets is further complicated by the rapidly evolving global landscape for CCPs. In some ways, a theoretical optimum might be a single global CCP clearing all product classes, since this would maximise multilateral netting opportunities and reduce counterparties' associated collateral requirements. However, this solution would lead to concerns around the concentration of risk in a single global CCP and its participants. In any event, the reality is that this option shows

15 For a more detailed comparison of some of the costs and benefits of bilateral and centrally cleared arrangements, see European Commission (2009).

no signs of eventuating, and therefore a significant degree of clearing fragmentation appears likely to be a feature of markets for some time to come. One consequence of this fragmentation is that market participants may need to join, or clear different types of OTC transactions through clearing participants of, more than one CCP. This, together with changes to banks' capital charges for OTC derivatives exposures and other regulatory developments, makes it difficult to assess the overall impact on the Australian market of various potential clearing arrangements.

2.2. Bilateral Risk Management in OTC Derivatives Markets

Two areas in which the risks of OTC derivative markets differ substantially from traditional exchange-traded markets are in relation to counterparty risk and operational risk. The regulators' 2009 survey report discusses these risks in more detail, including measures available to market participants to mitigate them.

2.2.1. Counterparty risk

Counterparty risk is the risk that contracted financial obligations are not fulfilled as required. This risk may have a credit risk or liquidity risk dimension. Since large market participants often have numerous counterparties with which they have undertaken offsetting positions, the default or non-performance of one participant can potentially reduce the ability of the non-defaulting counterparty to meet its obligations in turn. Depending on the magnitude and incidence of any defaults, counterparty risk may have systemic implications.

The counterparty risk of an OTC derivatives transaction can be very long-lived, with some contracts lasting several years, or even decades. The complexity of counterparty risk management by active market participants is compounded by a build-up of positions across multiple counterparties over time.

To manage some of this risk, the chief tools that are generally used in bilateral arrangements include:

- due diligence and counterparty approvals;
- the agreement of robust legal documentation; and
- the collateralisation of exposures.

Naturally, a first protection against counterparty risk is to understand the nature of the counterparty, as with other credit relationships. This can be straightforward – for instance, where counterparties have an established banking or dealing relationship – or some preliminary steps may be needed before trading is undertaken. As part of a trading relationship, it is common for the rights and obligations between two counterparties to be governed by a master agreement that applies to all transactions, rather than a detailed (long form) contract needing to be negotiated for each transaction. A master agreement typically allows one counterparty to calculate a net exposure across all its positions with respect to another counterparty, and sets out the circumstances under which positions can be closed out. An international industry body, the International Swaps and Derivatives Association (ISDA), has developed a master agreement that is in wide use among active market participants.

This agreement is often supplemented by a Credit Support Annex (CSA) to cover collateralisation arrangements. The CSA sets out arrangements for how and when a counterparty must provide collateral (such as pay margin) to offset adverse price movements, with this often calculated as a net requirement across all positions between two counterparties. In the event of a counterparty's default, the only liability that exists between two counterparties is a single marked-to-market position netted across all eligible transactions.[16] Where marked-

16 In many jurisdictions, the legal robustness of these netting and close-out arrangements is underpinned by legislation. In Australia, the relevant legislation is the *Payments Systems and Netting Act 1998*.

to-market positions have been well collateralised, the potential loss faced by the non-defaulting counterparty may be significantly reduced. For prudentially regulated market participants, legally enforceable netting can also reduce the amount of capital that must be held against counterparty exposures.

The bilateral nature of these legal arrangements provides flexibility in tailoring agreed terms to individual circumstances, which is clearly a benefit for many counterparties. However, a consequence of this flexibility is that parties' relative negotiating power can be a factor in determining the strength of risk management arrangements. For instance, high volume clients, or counterparties with higher credit standings, may be able to negotiate more favourable terms.[17] Over the lifetime of a contract, commercial considerations can also be a factor in determining how rigorously provisions are enforced. The potential for an uneven application of risk management standards is therefore a key disadvantage of bilateral arrangements.

Data from ISDA indicate that in 2010 around 70 per cent of global OTC derivatives trades were subject to collateral arrangements (Table 1). Within this, there is considerable variation depending on dealer size and product type; more than 90 per cent of credit derivatives trades across all dealers are covered by collateral agreements (reflecting the incremental reform process discussed in Section 1.2), while only around 40 per cent of commodity derivatives transactions have collateral agreements in place. The extent of collateralisation actually employed under these arrangements also varies considerably, depending on the size of the dealer and the nature of the counterparty. Non-financial counterparties, such as corporate treasuries and governments, generally exhibit lower levels of collateralisation, whereas fund managers and banks have higher levels; collateralisation levels are generally higher for transactions undertaken by larger dealers (Graph 1). The Australian regulators' 2009 survey found a similar pattern of collateralisation across counterparty types in the Australian market.

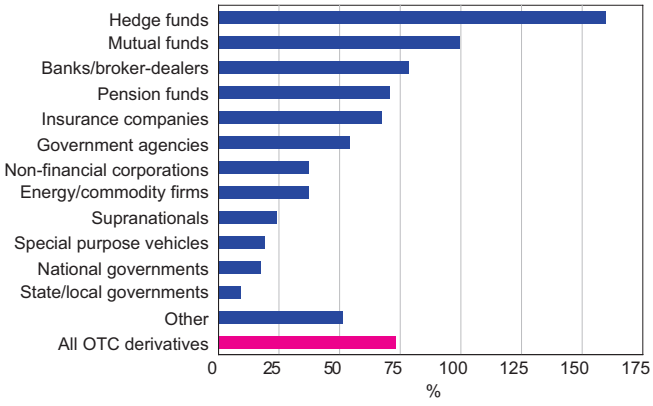
Table 1: OTC Derivatives Covered by Collateral Agreements
Per cent of derivatives trades[(a)]

Product type	Large dealers	Medium/small dealers	All dealers
Interest rate	88	75	79
Credit	96	92	93
FX	65	53	58
Equity	73	72	72
Commodity	63	57	60
All products	**80**	**66**	**70**

(a) Unweighted average across dealers
Source: ISDA Margin Survey 2011

17 As an example, counterparties with traditionally high credit ratings, such as sovereigns, have typically had 'one-way' agreements in place, whereby they can demand collateral should valuations move in their favour, but not be obliged to make payments should valuations move against them.

Graph 1
Collateralisation Levels by Counterparty Type
Collateral held as a share of dealers' net OTC derivatives exposures to counterparties*

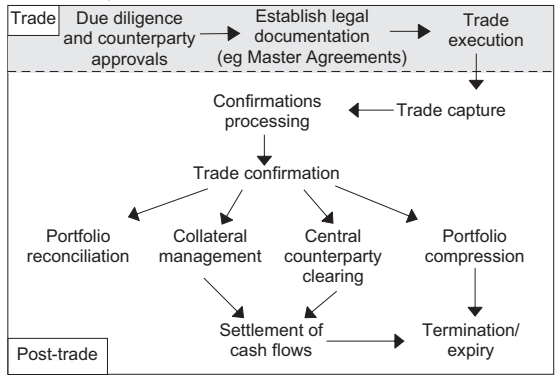


* Unweighted average across all dealers
Source: ISDA Margin Survey 2011

2.2.2. Operational risks

As well as counterparty risks, the long maturity and bespoke nature of many OTC derivatives contracts can give rise to numerous life cycle events that can bring a variety of operational risks (Figure 1). For active market participants with many simultaneously open contracts, the risk management task can be extremely complex. In many instances, these risks can be efficiently mitigated through automated and electronic processes, though the efficacy of these is often dependent on how widely they are used by other counterparties. Individual counterparties' operational capacities can also be a factor in determining the effectiveness of some of these arrangements. For instance, for a margin call to proceed smoothly, both counterparties need to agree on valuations, both counterparties need to agree on how and when any necessary collateral will be exchanged, and both counterparties need to be able to execute this transfer in a timely manner.

Figure 1
Life Cycle of an OTC Derivatives Contract

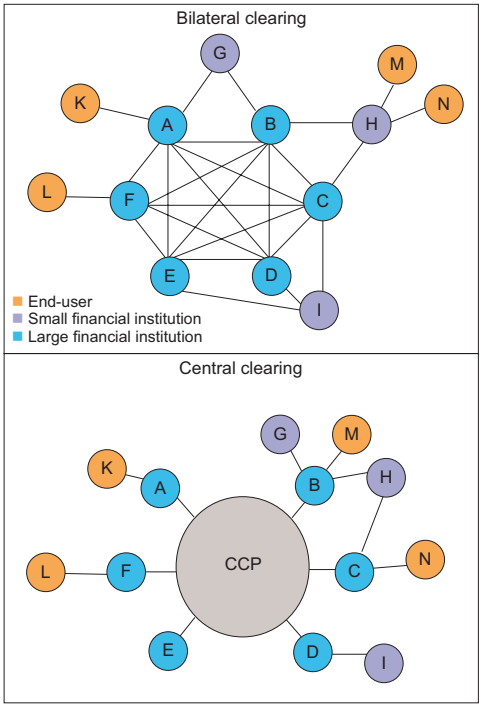


Active market participants must therefore be able to handle a host of cash flows, securities transfers and valuations across the multitude of positions they have with their counterparties, which can require significant investment in internal operational systems. In order to reduce some of these problems, proprietary and third-party vendor systems have been developed to streamline the management of some transaction life cycle events such as trade confirmations, mark-to-market valuations, collateral management, portfolio reconciliation and settlement of cash flows.

2.3. Central Counterparties and OTC Derivatives

There is a limit, however, to the improvements to system-wide risk management that can be accomplished by unilateral and bilateral tools. In part, this is because a move from one set of arrangements to another can be difficult to co-ordinate across all market participants. In order to better manage the proliferation of bilateral counterparty exposures, to ensure uniformly high standards of counterparty risk management, and to accommodate the growing operational complexity of OTC derivatives markets, regulators and market participants have been examining the potential for central clearing in these markets. Moreover, recognising that individual market participants may not fully internalise the costs of higher systemic risk arising from bilateral arrangements, and so not have an incentive to move to a CCP, numerous jurisdictions have been mandating central clearing for some markets.[18]

Figure 2
OTC Derivatives Counterparty Relationships



2.3.1. The design and benefits of central clearing

The key to central clearing is that, through a legal process known as novation, a trade that is dealt between two counterparties can be given up to a CCP. As a result of this, the CCP assumes responsibility for the obligations associated with the trade by becoming the buyer to every seller, and the seller to every buyer. This mechanism allows the numerous bilateral exposures of a market participant to be substituted for a single net exposure to a financially and operationally robust CCP (a stylised representation of this is shown in Figure 2). The resulting multilateral netting has the potential to substantially reduce the size of individual counterparties' outstanding obligations relative to bilateral arrangements, reduce market-wide liquidity and collateral needs, and reduce prudentially regulated firms' capital requirements. The capital efficiency attractions of central clearing will be further increased by the revisions to the Basel Accord noted in Section 1.3.2, that will give

18 For further discussion on some of the issues discussed here, see Duffie, Li and Lubke (2010), and Pirrong (2011). For a discussion of central clearing considerations for some specific OTC derivatives classes, see RBA (2009) for credit derivatives, and Manning, Heath and Whitelaw (2010) for foreign exchange markets. The latter uses a stylised example to illustrate the reduction in exposures that can result from a centrally cleared arrangement.

centrally cleared exposures a substantially lower risk weighting than bilateral exposures (subject to certain conditions being met).

Use of a CCP does not necessarily reduce the amount of risk in a market, but rather concentrates it. This obviously creates a risk management need for the CCP, for which it will typically use risk mitigation tools similar to those used in bilateral arrangements:

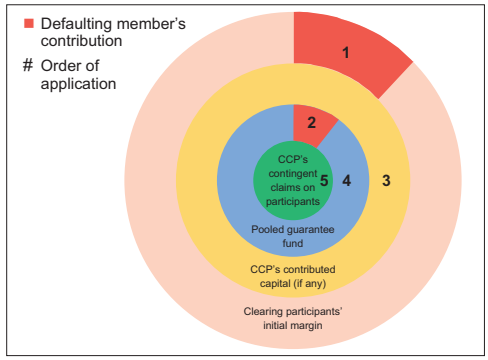
- CCP participants can be required to meet minimum credit standards and undergo initial and ongoing due diligence examinations. Such participants are known as *clearing*, or *direct*, participants of the CCP.
- The netted down exposures between a clearing member and the CCP are typically subject to standardised risk management tools, including initial and variation (or mark-to-market) margins.

The setting and enforcement of these risk management tools are likely to be free from some of the commercial considerations that may, as discussed above, play a role in bilateral arrangements.

The central role of the CCP, and its oversight of the entire market that it clears, can enable a counterparty default to be handled in a more orderly manner relative to a situation of bilateral exposures. Although a CCP will calculate margin requirements daily based on market movements, so as to ensure that it is well secured in the event of a participant's default, it also typically maintains additional financial resources to deal with extreme events. These resources may include clearing participants' contributions to a pooled guarantee fund and/or capital contributed by the CCP itself.[19] Where a CCP needs to cover a defaulting participant's positions, it will often have rules that require non-defaulting participants to co-operate in a collective and equitable resolution mechanism. For instance, where the collateral of the defaulting participant (in the form of margin and other contributions) is insufficient to cover any resulting losses, the CCP's rules will set out the order in which its additional financial resources will be utilised, as well as the method in which any losses may be allocated among participants (see, for example, Figure 3). If all 'paid-up' financial resources have been exhausted, the CCP may have the right to call for additional contributions from surviving members. For some products, a CCP may also call on members to take on a defaulting participant's positions. In effect, the loss absorption mechanism provided through the CCP plays a role similar to a sinking fund or insurance for the market that it is clearing. The mutualisation of risk and the constraints imposed on participants' behaviour can also help prevent 'fire sales' or other destabilising actions, thereby contributing to the resilience of the markets served by the CCP. Therefore, although on the one hand a CCP is designed to reduce some of the interdependencies between members, the ongoing success of a CCP will depend on the continuing alignment of members' interests and their preparedness to underwrite it as necessary.

By acting as a central hub for other market participants, CCPs can co-ordinate operational improvements and efficiencies. For instance, CCPs can bring standardisation of legal frameworks, streamlined day-to-day payment flows and calculations, and reduced collateral management complexities. They

Figure 3
CCP's Financial Resource Depletion in Response to a Clearing Member Default



Source: Adapted from Duffie, Li and Lubke (2010)

19 The BCBS is currently considering an appropriate methodology for calculating risk weightings for participant contributions to CCPs' default funds; for more discussion, see BCBS (2010b).

also provide a focal point for regulation and oversight of market-wide risk management, as well as reduce information asymmetries in the market more generally.

To ensure the soundness and effectiveness of a CCP's risk management arrangements, the legal basis of a CCP is clearly very important. To become a clearing member of a CCP, a participant must agree to be contractually bound by its operating rules, part of which sets out the legal jurisdiction in which the membership terms are governed and to which the member submits. The CCP will typically hold members' default fund contributions and initial margin monies under legal structures governed by the CCP's home jurisdiction, while the default resolution arrangements of the CCP will rely on its home jurisdiction's bankruptcy and netting regimes.[20]

2.3.2. Direct and indirect clearing in centrally cleared markets

For dealers in some financial markets, the ability to participate in a CCP as a direct clearing member can be a competitive advantage for a number of reasons. First, being able to clear directly may provide a cost advantage to a dealer, either through greater netting opportunities (reducing capital and liquidity needs) or through avoiding an additional layer of fees for clearing through another participant. Second, direct clearing may provide a capital advantage in circumstances where indirect clearing through a CCP does not qualify for a lower risk weighting under the revised BCBS standards. Third, direct participation can also allow dealers to offer clients a more comprehensive service by combining both trading and clearing. Finally, membership of a CCP might act as a signal of a dealer's creditworthiness or market standing.

For other market participants – such as smaller banks with a more limited intermediary role in the market served by the CCP, or for buy-side end-users – the desire to be a clearing member might be less pressing, particularly given the significant financial and operational commitment taken on by clearing members. Instead, a CCP will often support arrangements for these participants to access many of the benefits of central clearing by being able to clear transactions via an existing clearing member as an *indirect* or *client* member. However, indirect members may face some bilateral risks should their clearing member default; the extent of this risk will depend on the specific legal and operational arrangements of the CCP.

A particular issue is how clients' initial margin monies are handled by clearing members and the CCP. For example, a client's initial margin might be held in an individual account with the CCP, or it might be co-mingled with the funds of a clearing member's other clients in an omnibus account. The repercussions of a clearing member's default on its clients will therefore depend on the nature of the segregation and portability arrangements in place.[21] Under revisions to the BCBS standards, the protection afforded by a CCP's arrangements in these respects will determine if a prudentially regulated indirect participant can receive a lower capital weighting for positions that are centrally cleared.[22] Even if a transaction has been cleared, if a CCP's counterparty risk mitigation offers a lower standard of protection for an indirect member than it does for a direct clearing member, the exposure may need to be treated as a bilateral one, rather than as a centrally cleared position – with a consequently higher risk weighting. For some market participants, this might be a deciding factor as to whether they seek to become direct members of a CCP or not.

20 For CCPs with foreign participants, the legal robustness of its arrangements may depend upon both jurisdictions' laws.
21 For more discussion of the issues surrounding the segregation and portability of client positions, see CPSS-IOSCO (2011, pp 66–70).
22 See BCBS (2010b).

2.3.3. Specific issues in the central clearing of OTC derivatives

In order for a CCP to clear a certain class of products reliably, there must be:

- a well established market and robust valuation methodology for this product, so that the CCP can confidently determine margin and default fund requirements, and appropriately manage a default scenario; and
- some standardisation of contracts, to facilitate the CCP's trade processing arrangements.

For exchange-traded instruments, these prerequisites are typically quite straightforward. In contrast, these tests may be more difficult for some OTC derivatives products, particularly where they have highly bespoke contract terms or difficult-to-model price movements. In these situations, it is arguably not appropriate for these products to be centrally cleared. Nonetheless, there are numerous classes of OTC derivatives that are actively traded in quite standardised forms, suggesting that these prerequisites can be met without too much difficulty. Indeed, as discussed in Section 2.5 below, a number of CCPs in offshore markets are either currently or prospectively clearing various classes of OTC derivatives.

Although some classes of OTC derivatives have a sufficient degree of product and pricing standardisation to permit central clearing, individual contracts within these classes may still contain highly tailored terms such as the contract maturity or periodic payment amounts and timing. In many cases, there may be no other contract that has exactly the same terms, and therefore it may not be possible to net off many individual contracts across counterparties. This is in contrast to, say, a clearinghouse for a traditional exchange, where typically many participants have traded numerous identical or fully fungible contracts that can be closed out on a regular basis. Centrally cleared positions might, though, be able to be simplified through the use of portfolio compression tools, such as might be used for bilateral positions.

A CCP taking on heterogeneous and potentially long-lived OTC derivatives exposures is assuming similar risks to those currently faced in an OTC market by a financial intermediary such as a bank. However, market risk to the CCP will be fully hedged for all positions unless there is a CCP participant default. Since the contracts being submitted to the CCP by participants are likely to be individually tailored, this means that many individual contracts will likely continue to stay on participants' books, though with the CCP novated as the new counterparty. The effect of this is that the CCP is providing multilateral netting of *exposures* across a market, rather than of individual contracts. In the event of a clearing member's default, this means that potentially the CCP could be left with multiple individual positions against non-defaulting counterparties for which counterparties with precisely offsetting contracts cannot be found. The risk management of this could be a greater challenge than for CCPs serving highly liquid and fungible products. Rather than replace each defaulted transaction, the CCP may instead need to hedge these with a combination of new contracts that are economically equivalent to those of the defaulting member.[23]

2.4. Other Policy Considerations Regarding Central Clearing

CCPs can bring numerous benefits to markets. However, regulators must consider several interrelated matters regarding the consequences of central clearing for financial system efficiency and stability.

23 For more discussion of the distinctive features that should be considered in the central clearing of OTC derivatives, see CPSS-IOSCO (2010).

2.4.1. Default and crisis management

The fact that a CCP stands in the middle of other market participants, and therefore has comprehensive information on all participants' exposures, means that it is well placed to monitor the evolution of risks in the market that it is clearing – particularly where it is the sole CCP serving the market. Because of this, CCPs can centralise and co-ordinate default management within a market if necessary. This is a significant advantage of centrally cleared markets, in contrast to bilaterally organised markets where crisis management might be much more *ad hoc*.[24] This was demonstrated in the case of the default of Lehman Brothers in September 2008, where the various clearing houses of which it was a member were able to manage this large and complex event in a fairly orderly fashion.

Of course, a CCP standing between all other counterparties results in a very high concentration of counterparty and operational risk. Within systemically important markets, should the CCP itself fail – say, due to operational difficulties, inadequate risk management, or as a result of multiple participant failures – this has the potential to cause severe disturbances within the broader financial system. In part because of the stringent risk management arrangements of CCPs, there have been only a few recorded failures over recent decades.[25] The systemic importance of these entities also means that they are intensively regulated in many jurisdictions.

A key focus of regulatory oversight is the adequacy of a CCP's financial resources, since it acts as a loss absorber for the market it serves. In this regard, a CCP potentially faces liquidity and solvency risks similar to other financial institutions. To manage the risk that an obligation to make a payment cannot be met in a timely fashion (say, where a participant has failed to pay a margin call), CCPs generally hold their funds in highly rated and liquid financial assets, perhaps supplemented with back-up lines of credit from banks. As discussed in Section 2.3.1, a CCP will also have various layers of financial protection to cope with the possibility that the loss arising from a participant's default exceeds its paid-up margin.

In general, a CCP will calculate its financial resourcing requirements as appropriate to withstand extreme but plausible events, generally based on stress testing that incorporates a long run of historical experience. While this is designed to make a CCP highly resilient, there always remains the possibility that circumstances exceed a CCP's resources. For instance, a CCP may face a situation where market turmoil means that financial assets cannot be liquidated as needed. Alternatively, the default of one or more large participants may result in a substantial depletion of financial resources that endangers the CCP's status as a going concern. A CCP might then have a capacity to call on surviving clearing members to make additional contributions, but the success of this could be uncertain, particularly if clearing members themselves were under pressure. In these crisis situations, some involvement of public authorities may be necessary, given the importance of the CCP to broader financial markets, and the consequent disruption to markets if the CCP itself were to fail.

As well as financial considerations, a serious operational disruption to a CCP also has the potential to become a systemic event. Although CCPs generally have robust back-up systems and disaster recovery arrangements, it is unreasonable to expect that these could withstand all possible contingencies. A brief service disruption in benign market conditions is unlikely to be too troublesome for market participants. But if a significant or long-running disruption were to occur at a time of unsettled market conditions, the halt in transaction processing

24 Partly because of this aspect of a CCP's role, a senior official at the Bank of England has recently called on CCPs to think of themselves as 'system risk managers', putting this public role ahead of other more commercial considerations; for more discussion see Tucker (2011).

25 Researchers at the Bank of England have identified three instances of failure over the past 40 years: Caisse de Liquidation (Paris) in 1974; the Kuala Lumpur Commodity Clearing House in 1983; and the Hong Kong Futures Guarantee Corporation in 1987. For more discussion, see Hills, Rule and Parkinson (1999). For a discussion of the history of CCPs within the United States, and the challenges posed by various crises, see Bernanke (2011).

or payment flows, and/or uncertainty regarding the status of cleared transactions, may have a compounding effect on market uncertainty and liquidity pressures. Again, some public sector actions to mitigate the effects of this disruption, or to co-ordinate an industry-wide response, may be warranted.

Of course, since any prospect of public sector involvement gives rise to some potential moral hazard in a CCP's approach to mitigating these risks, this must be carefully managed by regulators. A key role of regulators in this respect is to ensure a CCP has put in place an appropriately high level of self-insurance, such as calibrating its financial resources to withstand the stressed default of one or more large participants.

2.4.2. Competition for clearing

The strong network effects at work with a CCP also mean that, historically at least, each particular market or set of products within a jurisdiction has been served by a single CCP. In part, this is because once a given central clearing arrangement is adopted, it can be difficult for participants to then co-ordinate a move to a different arrangement if ever this was desired. More recently, though, examples have emerged of multiple CCPs serving a single market. This development has likely been driven in part by changes in the regulatory landscape, technological advances and increasing globalisation of financial markets.[26] But the longer-run implications for market functioning, and whether any optimal design for the market for clearing services exists, are very much open questions.

Where a single CCP clears all products and participants in a market, it may have a greater capacity to monitor and mutualise risk across this market. A single CCP may also face less commercial pressure with regards to its choice of risk controls.[27] A CCP's operation is also likely to exhibit increasing returns to scale, reducing its unit costs, which potentially suggests a monopoly structure is the most efficient organisational arrangement. A single CCP might also provide greater netting opportunities for participants the more extensive is its product range and the number of participants it has. In contrast, CCPs that clear fewer products or have fewer participants might have higher costs, reducing their attractiveness to the market. Given a choice between clearing through a smaller CCP and not participating in the market, some dealers may exit, with a detrimental effect on the efficiency and liquidity of the market.

However, an increase in the scope of products and participants also increases a CCP's systemic importance. The incumbency of a CCP may also facilitate some monopolistic behaviour, such as charging excess clearing fees or only slowly enhancing its service offering. A consideration for regulators, therefore, is the potential for a mandatory clearing policy to contribute to the development of monopolistic power by CCPs. Careful consideration might need to be given to whether particular access requirements are imposed on such CCPs; this also raises the question of whether a user-owned CCP, a public utility or a commercial for-profit CCP should be preferred by policy makers.

2.4.3. Dealers, participation criteria and tiering

Where the scale and complexity of the CCP increase its risk management task, these may also have a bearing on the criteria it sets for accepting market participants as clearing members, potentially reducing the range of participants able (or willing) to join the CCP directly. As discussed in Section 2.3.2, direct participation can be an important distinction between dealers in a market, and a CCP's participation requirements can influence

26 For a discussion of these developments, see CPSS (2010).

27 As an example, the choice of initial margin rates set by a CCP can involve a trade-off between the short-run profitability of participants (who need to fund these margin payments) and the longer-run resilience of the CCP. Given a choice, myopic clearing participants may prefer a CCP with lower margin requirements (and potentially lower resilience) than one requiring higher margin payments.

the degree of tiering within a market. This will not only affect the status of dealers, but will also drive the extent of concentration risk within a market. For instance, if a smaller dealer were forced to clear as a client, and had only a restricted set of direct clearing participants to choose from, it may have less capacity to control counterparty exposures than under bilateral arrangements. If smaller dealers were unable to clear directly and they decided to exit markets where they had previously been active, this would see activity in these markets further concentrated in the hands of larger dealers.

Calibrating optimal participation criteria is a difficult challenge for CCPs, market participants and regulators, since these will in part be a function of the degree of heterogeneity of market participants, the scope and capacities of the CCP, and the characteristics of the products being cleared. Participation criteria that are set too stringently will result in an overly tiered market, while criteria that are too relaxed may increase the risks faced by a CCP and its members.[28]

2.4.4. Netting, liquidity and capital efficiency for participants

A move to central clearing of OTC derivatives will likely bring some costs to the market. First, the requirement to post initial margin will likely increase many market participants' collateral needs above levels that characterised bilateral arrangements, particularly where these do not currently require exposures to be collateralised. Second, a more widespread use of variation margin could see a net increase in the quantity of collateral held across the market.[29] Third, market participants who join CCPs as direct members will typically be obliged to make a contribution to pooled risk resources, as well as hold capital against their trades and any contingent obligations to the CCP. On top of all of this, ongoing fees that might be paid to CCPs will introduce further costs.

Central clearing of only part of a market participant's portfolio can potentially lead to increases in some counterparty exposures, particularly where previously offsetting bilateral exposures are 'un-netted' (that is, some positions are now cleared while others remain uncleared). This could be exacerbated if the various cleared components of a participant's portfolio are cleared through different CCPs . For some market participants, then, a single global cross-product CCP might be an optimal solution based on netting and collateral considerations alone.[30] However, the extent of un-netting compared to a bilateral position will depend on the composition of a participant's portfolio, and on the degree of netting that could be achieved through bilateral agreements as opposed to multilateral netting. For instance, a large globally active fund manager using derivatives to manage risks across multiple currencies and assets may see a substantial increase in collateral if these positions are cleared across numerous CCPs. In contrast, a small financial institution that occasionally hedges a particular exposure (say, credit or interest rate risk) through a small number of counterparties may be relatively indifferent to the configuration of CCPs.

One way to maintain or improve multilateral netting opportunities within a centrally cleared environment is to increase the range of products that are cleared through a single CCP.[31] While participants would in some respects welcome the netting and operational efficiencies (and associated capital benefits) that might accrue from a CCP increasing the range of its products, this further increases the concentration risk and systemic importance of this entity – a significant concern for many market participants and regulators.

28 See ASIC and Reserve Bank (2009) for a discussion of these considerations in the context of a review of participation requirements for the ASX's clearinghouse for cash equities.

29 For discussions of these and related issues, see, for instance, Singh and Aitken (2009).

30 See, for example, Duffie and Zhu (2011).

31 For a discussion of where an increase in the range of products cleared through a single CCP might have some benefits, see Jackson and Manning (2007).

As noted in Section 2.3.3, some OTC derivatives may not be amenable for central clearing in the near future, and so some fragmentation of bilateral and centrally cleared positions will likely persist. Fragmentation is already a feature of OTC derivatives markets that are currently centrally cleared, as discussed below in Section 2.5, and this is likely to be a part of the global landscape for some time. A market participant's exchange-traded positions may also contribute to the degree of fragmentation, given the sometimes close relationship between these transactions and similar OTC derivatives. Further complicating a comparison of capital requirements across different arrangements is the fact that, irrespective of any move to central clearing in Australia, under revised BCBS standards a higher capital charge for uncleared bilateral exposures will be imposed globally on many banks. In some jurisdictions, minimum margin requirements are being imposed on uncleared transactions even for non-prudentially supervised institutions.

Market participants in turn can be expected to adjust aspects of their operations – such as their organisational structures, market presences and trading strategies – in response to these economic and regulatory forces. This will also influence developments in the market for clearing services. The endogenous nature of these various factors makes it very difficult to determine *ex ante* what the overall effect of a move to central clearing might be on participants' capital and liquidity requirements, and the consequences of this for the cost and availability of services to end-users.

2.4.5. Links between central counterparties

As an alternative to an increased range of products within a given CCP, the capacity for participants to maintain or increase netting opportunities (for cleared products at least) can be facilitated by establishing links between CCPs.[32]

There are various forms of co-operation among CCPs. Two commonly discussed methods are cross-margining and interoperability. Under a cross-margining arrangement, two CCPs grant margin discounts to a common member who holds positions that are negatively correlated across the CCPs (such that the combined risk posed to both CCPs is less than the sum of the risk posed to each one separately). Although a market participant must still be a member of both CCPs, the arrangement restores some netting opportunities that would otherwise not be available.[33]

An interoperability arrangement, on the other hand, allows trades to be cleared without counterparties (or their clearing agents) needing to be members of both CCPs. Instead, depending on the details of the arrangement, the CCPs essentially become members of each other, allowing them to novate opposite sides of the same trade.[34] Two common models of interoperability are a 'peer-to-peer' arrangement, in which each CCP recognises the other as an 'equal', or a 'sub-CCP' model, in which one CCP acts as a clearing member of another. Such links create exposures between the CCPs that must be appropriately managed and collateralised. The management of such exposures has been a key focus of European regulators over recent years.[35]

A further example of co-operation between CCPs is a mutual offset arrangement. This allows traders on two exchanges to open a futures position on one exchange and liquidate it on another (for given fungible contracts with harmonised specifications and settlement prices). In this way the participant can choose the

32 For more discussion of CCP linkage arrangements, see Chapter 7 in European Central Bank and Federal Reserve Bank of Chicago (2007).

33 For example, CME has cross-margining arrangements with FICC, ICE and OCC. A similar arrangement operated between LCH.Clearnet Ltd and CME from May 2000, although this was recently terminated.

34 One example of such an arrangement is a link between LCH.Clearnet Ltd and SIX x-clear, enabling their members to clear equities trades made on either the LSE or SIX Swiss Exchange.

35 For a discussion of recent practical policy considerations of these issues, see Joint Regulatory Authorities of LCH.Clearnet Group (2008).

clearinghouse at which the contract is held, regardless of where this was executed. The clearing member at the CCP serving the first market gives up the contract to the trader's clearing member at the CCP serving the second market. This provides some efficiency by enabling a trader to consolidate positions at a single CCP.[36]

Co-operation between CCPs has the potential to restore efficiencies lost through un-netting that might result from the presence of multiple CCPs in a single market or serving different product classes. However, such arrangements also create exposures and interdependencies between CCPs, giving rise to regulatory concerns. Therefore, while the benefits to participants of such arrangements may be significant, they also clearly require careful consideration and regulatory oversight to minimise or mitigate any associated systemic risks.

2.5. The Global Landscape for OTC Derivatives Central Counterparties

While CCPs have been a component of traditional exchange-based markets for many decades, the emergence of CCPs dedicated to clearing OTC markets has only been a relatively recent development.[37] In the late 1990s, SwapClear – a service operated by LCH.Clearnet Ltd for clearing interest rate swaps – was developed in London, with this service now widely used by participants in the major European and US markets. Following the bankruptcy of Enron in 2001, clearing for OTC energy derivatives emerged in the United States. Recently, though, the development of OTC derivatives CCPs has been more driven by the accelerating regulatory agenda. For instance, the push for improvements to credit derivatives markets has seen several CCPs for this market emerge in Europe and the United States.[38] At the same time, new clearing services for interest rate derivatives have emerged. The regulatory imposition of central clearing requirements represents a fundamental change in the market for clearing services. Whereas CCPs had previously developed organically in response to the underlying economics of the markets they served, a growing number of CCPs have been entering the market as the push for central clearing of OTC derivatives has become more global and mandatory. The expanded commercial opportunities for central clearing that this regulatory effort is creating have also been an important factor in a number of recent merger or takeover proposals among global exchange and CCP operators.

The fluidity of the global market for clearing services has resulted in a good deal of uncertainty for Australian market participants in considering any move to a centrally cleared environment. Present indications are that more than 25 central clearing services are active or proposed, ranging across many OTC derivatives classes (Table 2). Both the European Union and the United States have multiple CCPs, while a number of smaller countries have also had CCPs established or proposed. In many cases, there is direct competition for clearing similar product classes.

36 Such an arrangement exists between CME and SGX for a limited range of derivatives contracts.

37 For a discussion of the longer run history of CCPs, and the recent development of clearing for OTC products, see Norman (2011).

38 For a discussion of some of the forces behind the establishment of CCPs clearing credit default swaps in the United States and Europe, see Chander and Costa (2010).

Table 2: Existing and Proposed OTC Derivatives Central Counterparties

As at May 2011

Domicile	Clearing service	Derivatives classes	Status
Brazil	BM&F Bovespa	FX, equity	Active
Canada	CDCC	Equity	Active
China	Shanghai Clearing House	Not yet specified	Proposed
France	LCH.Clearnet SA	Credit	Active
Germany	Eurex Clearing	Credit	Active
		Equity	Proposed
		Interest rate	Proposed
Hong Kong	HKEx	Interest rate	Proposed
India	Clearing Corporation of India	FX	Active
Japan	JSCC	Interest rate, credit	Proposed
Poland	KDPW_CCP	Interest rate	Proposed
Singapore	AsiaClear	Interest rate, commodity	Active
Sweden	Nasdaq OMX AB	Commodity	Active
		Interest rate	Proposed
United Kingdom	CME Clearing Europe	Commodity, energy	Active
	ICE Clear Europe	Credit, energy	Active
	LCH.Clearnet Ltd	Interest rate, equity, commodity	Active
		FX	Proposed
	NYSE Liffe	Equity, commodity	Active
United States	CME Group	Interest rate, credit, commodity, energy	Active
		FX	Proposed
	ICE Trust	Credit	Active
	IDCG	Interest rate	Active
	NYPC	Interest rate	Proposed
	Options Clearing Corporation	Equity	Proposed

Sources: FSB; RBA; *Risk* Magazine

3. OTC Derivatives Markets in Australia

3.1. Introduction

In order to consider what opportunities for central clearing might exist in Australian OTC derivatives markets, this section sets out some details of the types of products transacted, and the various participants. As with many countries, the Australian OTC derivatives market has grown rapidly in recent decades, reflecting a number of factors. Negotiated tailored contract terms in OTC markets are often more attractive to many market participants than the standardised contracts traded on traditional exchanges. With less prescriptive regulation of financial intermediaries, more of these trading opportunities have been exploited, which in turn has been supported by improvements in participants' operational and risk management capacities.

Various components of the domestic OTC derivatives market have therefore come to play a significant role in the domestic financial system, even though the absolute scale of the local market is small by global standards. Utilisation of derivatives is widespread among the banking sector, as well as among smaller financial and non-financial users. The functioning of these markets is supported by the cross-border activity of many participants, with global dealers playing an important role. However, as with many smaller markets, the activity of global dealers is complemented to a significant extent by locally based market participants.

3.2. Australian Market Structure and Characteristics

Derivatives are used quite extensively by many sectors of the Australian economy. As at December 2010, the estimated market value of cross-sectoral bought (or sold) positions across all derivatives classes (both exchange traded and OTC) was around $350 billion (Table 3).[39] The largest component of this was positions bought and sold between domestic financial institutions and offshore counterparties (largely financial institutions). However, the public sector and the non-financial corporate sector are also significant users, each with around $30 billion of bought and sold positions outstanding as at December 2010.

39 The market value of every derivative position is a positive for one counterparty and a negative for another. In aggregate, therefore, the net value of all bought and sold derivatives outstanding is zero.

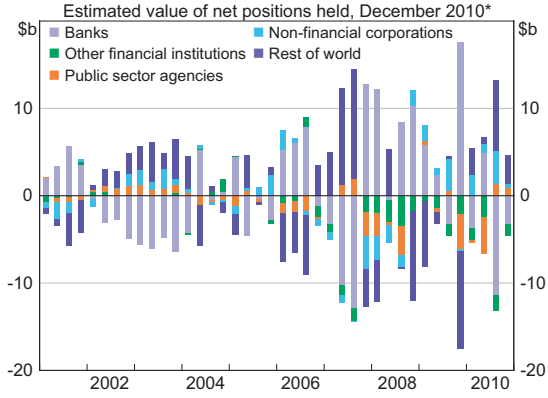
Table 3: Derivatives Positions Outstanding Across Sectors
$ billion, estimated value as at December 2010

Seller	Buyer					
	Banks	Other financial institutions	Public sector	Non-financial corporations	Rest of world	**Total**
Banks	--	29.1	7.7	6.9	85.7	**129.4**
Other financial institutions	28.4	--	15.4	14.6	8.7	**67.1**
Public sector	7.5	15.1	--	0.0	4.6	**27.2**
Non-financial corporations	6.7	14.2	0.0	--	5.2	**26.1**
Rest of world	83.6	7.3	4.9	5.2	--	**101.0**
Total	**126.3**	**65.7**	**28.1**	**26.6**	**104.2**	**350.8**
Value of net positions held	***–3.2***	***–1.4***	***0.9***	***0.5***	***3.3***	***0.0***

Source: ABS

Although the net value of bought and sold positions for each sector was fairly balanced as at December 2010, changes in underlying financial prices can result in large movements in positions. For instance, exchange rate fluctuations over the past few years have seen large swings in domestic sectors' net derivatives positions vis-à-vis offshore counterparties (Graph 2). Movements in domestic and international interest rates have also contributed to swings between the domestic banking sector and other counterparties. To the extent that these various bilateral positions are covered by CSAs, the movements in mark-to-market valuations can result in significant transfers of collateral within and between sectors.

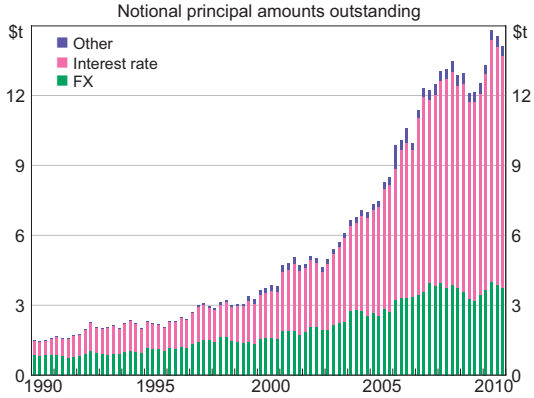
Graph 2
Outstanding Derivatives Positions in Australia
Estimated value of net positions held, December 2010*



* Excludes intra-sectoral positions
Sources: ABS; RBA

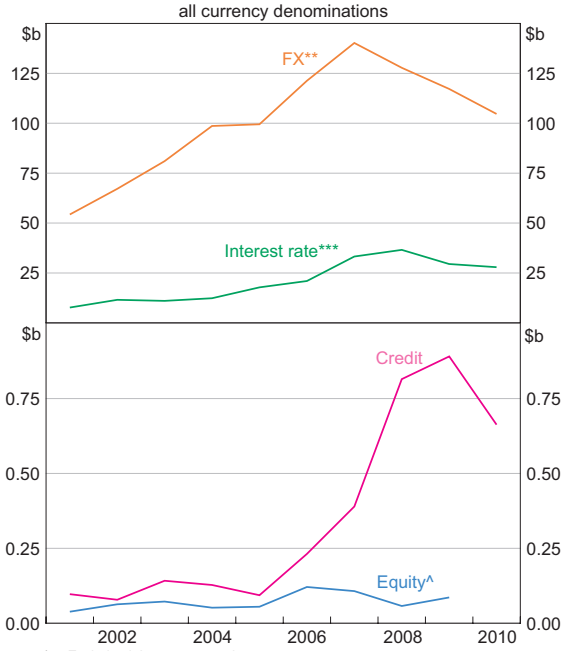
These net market valuations of positions are significantly smaller than gross positions on large counterparties' books. Because redundant OTC derivatives positions are not generally closed out (unlike exchange-traded derivatives), turnover volumes result in a significant build-up of gross outstanding positions for dealers. As at December 2010, the gross notional amount of derivatives outstanding on Australian banks' books (off balance sheet) was around $15 trillion dollars, a much larger figure than the estimated market value of these positions (Graph 3). The bulk of this build-up is due to interest rate derivatives, reflecting both the longer maturity of many interest rate derivatives contracts, and the heavy utilisation of these as hedging instruments by banks and their counterparties. FX derivatives comprise a smaller, though still significant, share. The relatively slower build-up in these positions over time largely reflects the much shorter duration of many FX instruments (in general, these may last only a few days or weeks, compared with many months and years for interest rate derivatives). The interdependencies of counterparties and operational complexities resulting from the build-up of these positions are prime reasons why some central clearing of these positions

Graph 3
Australian Banks' Derivatives Positions*
Notional principal amounts outstanding



* Includes both OTC and exchange-traded derivatives for locally incorporated banks and foreign banks' branches; not adjusted for double counting
Source: APRA

Graph 4
Australian OTC Derivatives Market Turnover*
Notional principal amounts, daily average for financial year, all currency denominations



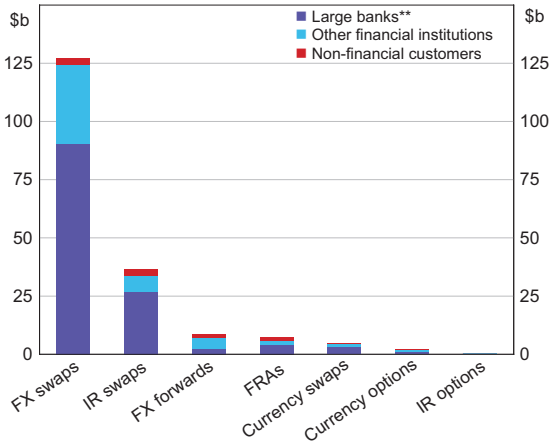
* Excludes inhouse transactions
** FX forwards, swaps and options
*** Includes single- and cross-currency derivatives
^ 2010 data not available
Source: AFMA

is desirable (though separate portfolio compression facilities can also play a useful role in reducing some of the complexities of gross outstanding positions).

Data from AFMA indicate that over the year to end June 2010, daily average turnover in Australia of OTC FX derivatives was a little above $100 billion, while OTC interest rate derivatives turnover was around $30 billion (Graph 4).[40] Turnover in other derivatives products was much lower; the next most active market was credit derivatives, with daily average turnover of around $650 million over this period.

A large part of the turnover in FX and interest rate derivatives markets is inter-bank activity, with these institutions hedging positions built up through market-making activity, or for proprietary purposes. According to data from the Bank for International Settlements (BIS), around 70 per cent of total turnover reported by Australian-located counterparties is undertaken with another bank, either domestically or offshore (Graph 5).[41]

Graph 5
Australian OTC Derivatives Counterparties
Notional principal amounts, daily average turnover, April 2010

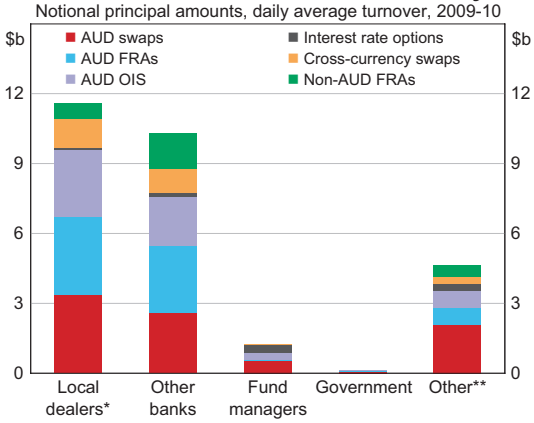


* Includes domestic and offshore counterparties
** Includes institutions classified as dealers in any global market or product
Source: BIS

40 Note that these turnover figures measure the notional principal of contracts. Because of the derivative nature of these transactions, the full principal is generally not exchanged at the time the transaction is initiated, nor might it ever be exchanged over the lifetime of the contract. This is unlike transactions in securities such as equities or bonds, where the full amount of consideration is exchanged at the time the transaction is settled.

41 Note that data sourced from AFMA and BIS are not strictly comparable, in part due to differences in the data collection basis, and different categorisations of the Australian operations of foreign banks.

Graph 6
OTC Interest Rate Derivatives Activity
Notional principal amounts, daily average turnover, 2009-10

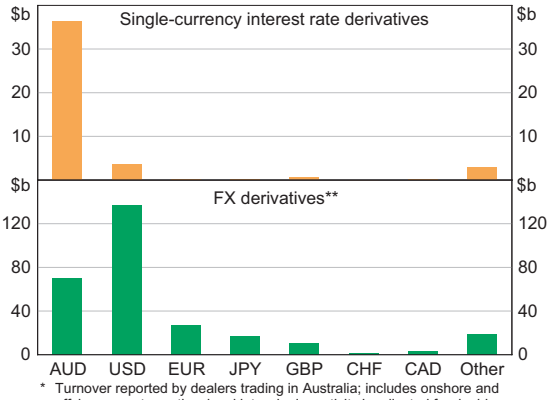


* Excludes inhouse transactions
** Includes domestic and offshore financial and non-financial counterparties
Source: AFMA

Within this inter-bank activity, a smaller number of institutions play a dealing or market-making role for the local market. For the domestic OTC interest rate derivatives market, around $12 billion, or 40 per cent, of average daily turnover is between local dealers (Graph 6). (Equivalent data is not available for the FX derivatives market.) A slightly smaller share of interest rate derivatives turnover consists of transactions between a dealer and another local bank (either Australian-incorporated banks or local branches of foreign banks). Smaller amounts of turnover are seen for end-users such as fund managers and government users. Other counterparties include domestic corporate treasuries, as well as offshore non-financial and financial counterparties (a further breakdown of these categories is not available). Within each class of interest rate derivatives, shorter term instruments (such as overnight indexed swaps and forward rate agreements) are less used by non-financial counterparties, with these instruments mainly used by banks to hedge short-run funding requirements. Longer-term instruments, such as single- and cross-currency interest rate swaps, are also heavily used by banks to manage interest rate risk on their balance sheets. Non-financial counterparties use them for a similar purpose, though turnover is more sporadic.

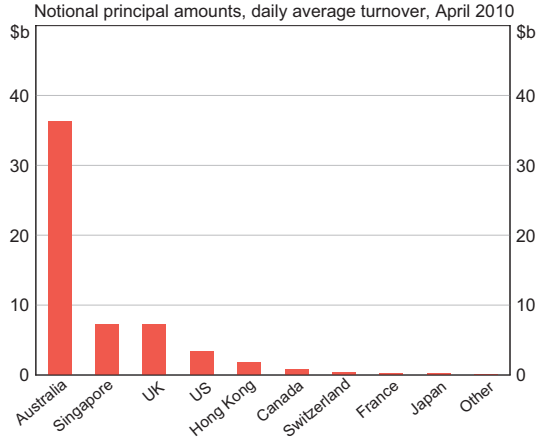
As would be expected, domestic market activity in OTC derivatives is highly concentrated in products with an Australian dollar-denominated component (Graph 7). This reflects the underlying demand of local participants using these instruments to hedge their domestic and cross-border borrowing, lending and payment flows. Unsurprisingly, counterparties located in Australia account for the bulk of global turnover for Australian dollar-denominated interest rate derivatives, given much of the underlying global demand for hedging Australian dollar borrowing and lending arises within Australia (Graph 8). Around 90 per cent of Australian dollar-

Graph 7
Australian OTC Derivatives Turnover by Currency*
Notional principal amounts, daily average turnover, April 2010



* Turnover reported by dealers trading in Australia; includes onshore and offshore counterparties; local inter-dealer activity is adjusted for double counting; excludes offshore activity of Australian institutions
** Specified currency against all other denominations
Sources: BIS; RBA

Graph 8
Trading in AUD Interest Rate Derivatives*
Notional principal amounts, daily average turnover, April 2010



* Location of one or both counterparties; within-country transactions are adjusted for double counting
Source: BIS

denominated transactions (by notional principal value) involve at least one counterparty that is located in Australia. In contrast, partial data on FX derivatives with an Australian dollar component indicate that only around 35 per cent of global turnover in these instruments involves counterparties located in Australia (a detailed geographical breakdown of these instruments is not available). The less dominant role of domestically located counterparties reflects the fact that the Australian dollar is one of the most actively traded currencies around the world.

The local dealer community consists of a range of foreign banks along with the larger Australian-owned banks (Table 4). While some domestic and foreign dealers are market-makers in many classes of OTC derivatives, others take a more specialist role. Overall market turnover activity is quite highly concentrated, with the top eight dealers in each market segment generally accounting for 90 per cent or more of total turnover.

Table 4: Largest OTC Derivatives Dealers Active in Australia[a]

Dealer	Headquarters	FX derivatives[b]	Interest rate derivatives[c]	Equity derivatives	Credit derivatives
ANZ Banking Group	Australia	X	X		X
Bank of America–Merrill Lynch	US			X	
Bank of Scotland plc Australia Branch	UK		X		
Bank of Tokyo-Mitsubishi UFJ	Japan	X			
Barclays Capital	UK	X			
BNP Paribas	France	X	X		X
Citi	US	X	X	X	X
Commonwealth Bank of Australia	Australia	X	X		X
Deutsche Bank AG Australia	Germany	X	X	X	X
Goldman Sachs	US			X	
HSBC Bank Australia	UK	X	X		
J.P. Morgan Chase Bank, NA	US	X	X	X	X
Macquarie Group	Australia	X	X	X	X
National Australia Bank	Australia	X	X	X	X
RBS Group (Australia)	UK		X		
Royal Bank of Canada	Canada	X			
State Street Bank and Trust Company	US	X			
UBS AG, Australia Branch	Switzerland	X	X		X
Westpac Banking Corporation	Australia	X	X	X	X

(a) FX derivatives dealers are top 15 by turnover from RBA 2010 FX survey, equity derivatives dealers are 2009 AFMA market report survey respondents, dealers for other categories are 2010 AFMA market report survey respondents. Not all dealers are active in all products within a category.
(b) Includes FX swaps, forwards and options.
(c) Includes single- and cross-currency interest rate swaps, forward rate agreements, overnight indexed swaps, and interest rate options.
Sources: AFMA; RBA

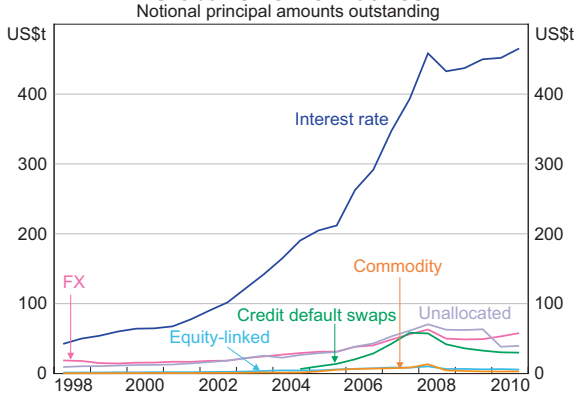
The presence of foreign-owned dealers in Australia, along with the offshore operations of Australian banks, facilitates trading across a larger range of counterparties than is available within Australia alone, thereby increasing liquidity and facilitating the transfer of risk for domestic market participants. As well as a considerable amount of cross-border activity, the distinction between domestic and offshore activity is further blurred by the common practice of foreign banks booking activity undertaken through an Australian branch or subsidiary in the name of an offshore legal entity (such as a global headquarters). In this way, an internationally active bank can consolidate large parts of its global derivatives activity in a single entity, which can result in capital, liquidity or taxation efficiencies.

3.3. Comparison of the Australian and Global OTC Derivatives Markets

Notwithstanding the significant scale of market activity in Australia, by global standards the domestic OTC derivatives market is relatively small. According to data from the BIS, the aggregate gross notional value of all OTC derivatives products was around US$600 trillion as at December 2010 (Graph 9). Global gross notional outstandings doubled in the five years to December 2010, though have fallen 10 per cent from their peak in June 2008. The difference between gross notional amounts and gross mark-to-market exposures is as significant in the global market as it is in Australia, with the market value of global positions as at December 2010 estimated to be only around 5 per cent of notional outstanding amounts. As with Australia, global activity is dominated by interest rate and FX derivatives, though credit derivatives have grown strongly over the past decade.

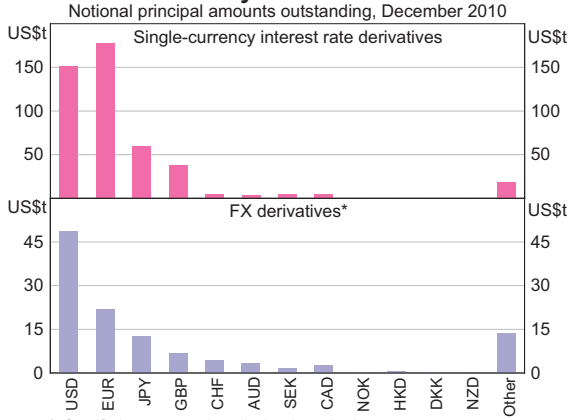
The vast bulk of instruments are denominated in only a handful of currencies. Across interest rate derivatives, for example, the outstanding value of euro-denominated contracts was around US$180 trillion and US dollar-denominated contracts around US$150 trillion as at December 2010. These two markets jointly account for over 70 per cent of the global aggregate notional amount outstanding (Graph 10). A further 20 per cent of the global market is attributable to yen- and sterling-denominated contracts. Outstanding amounts of interest rate derivatives in other currency denominations (of which available data suggest there are active markets for 50 or more) make up less than 10 per cent of the total. Similarly for FX derivatives, the vast bulk of activity is accounted for by transactions with a US dollar, euro, yen or sterling leg. Australian dollar-denominated interest rate and foreign exchange derivatives comprised only 1 per cent of outstandings.

Graph 9
Global OTC Derivatives
Notional principal amounts outstanding



Source: BIS

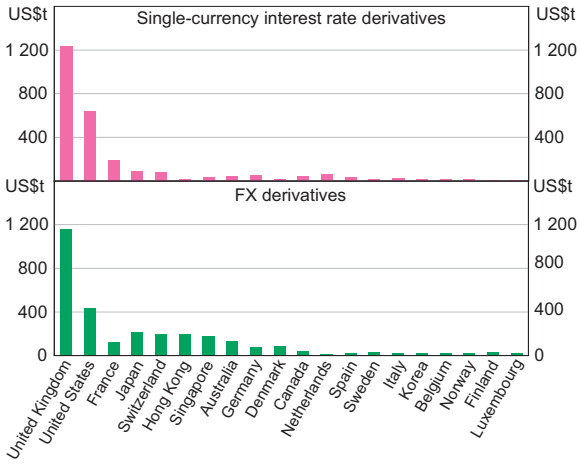
Graph 10
Global OTC Derivatives by Currency Denomination
Notional principal amounts outstanding, December 2010



* Specified currency against all other denominations
Source: BIS

Graph 11
Location of OTC Derivatives Activity*

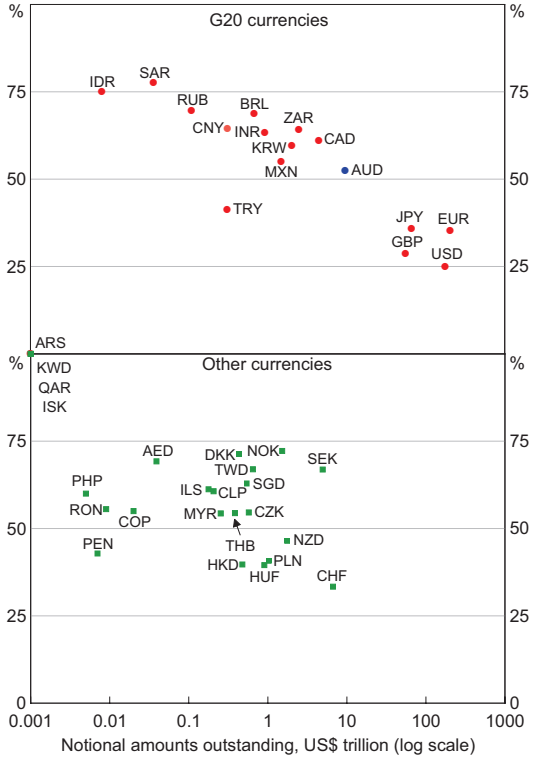
Notional principal amounts, daily average turnover, April 2010



* Largest 20 reporting countries by counterparty location
Source: BIS

Graph 12
Interest Rate Derivatives Counterparties*

Share of G14 transactions with non-G14 counterparties**



* Based on trades registered by G14 dealers; as at end May 2011
** By currency denomination of derivatives transactions
Source: TriOptima

Counterparties trading in these instruments are concentrated in a small number of jurisdictions. The United Kingdom is by far the largest financial centre, followed by the United States (Graph 11). Australia is one of the ten or so largest financial centres for these instruments, but like other European and Asian financial centres, the level of local activity is significantly smaller than that seen in the largest global centres.

Activity in global derivatives markets is dominated by a relatively small group of large dealers. Data from TriOptima's trade repository for interest rate derivatives gives a detailed picture of the role of this group – similar data is not currently available for FX derivatives. According to these data, the largest fourteen global (G14) dealers had around US$550 trillion of notional outstanding interest rate derivatives as at May 2011.[42, 43] Around 70 per cent of this can be considered inter-dealer activity: 20 per cent of transactions by value were with other G14 counterparties, and around 50 per cent of transactions were inter-dealer transactions centrally cleared using CCPs operating in offshore markets. Only around 30 per cent of transactions were with other counterparties, such as non-G14 dealers and banks, and buy-side financial and non-financial market participants.

However, this aggregate picture masks significant variation in the dominance of the largest dealers across different currency denominations. The G14 dealers are clearly dominant within the US dollar-denominated interest rate derivatives market. The bulk of these transactions are intra-G14 – either bilateral positions with other G14 counterparties or centrally cleared – while transactions with non-G14 dealer counterparties make up only 25 per cent of outstandings (Graph 12). Similarly, for the sterling, euro, yen and Swiss franc, transactions with non-G14 counterparties make up only 30 to 40 per cent of the relevant totals.

42 Note that BIS data and TriOptima data are not strictly comparable, with some differences in product coverage and methodology.

43 The G14 dealers are: Bank of America–Merrill Lynch; Barclays Capital; BNP Paribas; Citi; Credit Suisse; Deutsche Bank AG; Goldman Sachs & Co; HSBC Group; J.P. Morgan; Morgan Stanley; The Royal Bank of Scotland Group; Société Générale; UBS AG; Wells Fargo Bank, N.A.

But moving beyond this handful of largest markets, the importance of smaller counterparties to the G14 dealers increases substantially, with a notable increase in the share of transactions undertaken with non-G14 counterparties. For Australian dollar-denominated products, for instance, around 55 per cent of G14 dealers' transactions involve counterparties outside this group of global dealers. This pattern is similar for most smaller markets; for particularly small markets, the share of non-G14 counterparties increases to 70 per cent or more. The greater share of transactions undertaken outside the G14 dealers reflects the significant role of non-G14 banks and dealers in these markets. Furthermore, the true significance of non-G14 counterparties in many of these markets is almost certainly understated by these data.[44]

Overall, these figures clearly indicate that, outside the small number of very large markets, global dealers have a much less dominant role. Their presence is an important one, though, and the global nature of their activity is a key factor in the interconnectedness of global markets. However, the significant degree of variation in the scope and scale of dealers active in OTC derivatives markets, and the extent of cross-border activity around the world, pose a challenge for developing suitable central clearing solutions across jurisdictions, Australia included.

44 The TriOptima trade repository is not yet receiving much in the way of direct reporting by non-G14 market participants, meaning that the figures do not reflect non-G14 dealers' transactions with other non-G14 counterparties. Data from TriOptima do not permit a breakdown of the categories within non-G14 counterparties.

4. Key Policy Design Considerations

4.1. Introduction

In developing recommendations regarding central clearing of OTC derivatives, the Council agencies are looking to balance the implications for both the efficiency and stability of the Australian financial system, given the role and structure of the Australian OTC derivatives market and participants, the nature of central clearing, and other domestic and international regulatory considerations.

4.2. What Products Should be Subject to a Clearing Requirement?

Although higher capital charges for non-centrally cleared transactions may provide an incentive for increased use of CCPs, internationally regulators are developing mandatory clearing requirements. One consequence of this is that Australian market participants, to the extent that they are trading with counterparties from these jurisdictions, may find they are indirectly subject to mandatory clearing, irrespective of any local decisions. In part to provide more certainty to Australian participants in this event, as well as to harmonise the domestic regulatory regime with international developments, the Council agencies consider that some domestic mandatory clearing requirement may be appropriate.

The Council agencies are of the view that any mandatory requirement to centrally clear products should take into account both the potential systemic risk reduction benefits of central clearing over bilateral arrangements, and the viability and appropriateness of products being centrally cleared. This will, in part, reflect the volume of activity in a given product class, as well as the nature and range of market participants. As well, the Council agencies believe that the products subject to a clearing mandate should, as much as possible, be harmonised with other jurisdictions' requirements (recognising that market differences may mean complete harmonisation is not appropriate).

The Council agencies also believe that there are merits in an Australian regulatory regime containing both the 'bottom-up' and 'top-down' approaches for determining which products should be clearable, similar to the regulatory frameworks being established in several major foreign jurisdictions (discussed in Section 1.3.1). Although it would be expected that industry-led (bottom-up) solutions would predominate, having top-down provisions would give regulators scope to overcome possible industry co-ordination difficulties in circumstances where a clear case for central clearing could be made.

The decision to designate a product as clearable may also have some implications for competition in the market for both clearing services and intermediation services. Potentially, a CCP that was authorised to clear a product that was mandated to be centrally cleared might be in a monopolistic position; the efficiency implications of this are unclear, though regulators may need to consider imposing access arrangements or

other conditions for this CCP. Depending on the structure of the CCP's participation criteria, mandating a product as clearable might also have implications for tiering across market participants dealing in that product. These issues will need to be considered carefully.

As discussed in Section 3.2, the Australian OTC derivatives market is dominated by activity in the interest rate derivatives market and the FX derivatives market. Only relatively small amounts of activity are seen in products that have received heightened attention in other jurisdictions, such as credit derivatives. This suggests that, in practice, the only OTC derivatives products traded in the Australian market that might currently meet the tests of systemic risk reduction, clearing viability and global harmonisation, are interest rate derivatives and some FX derivatives (namely FX options). As noted in Section 1.3.1, the US Treasury Secretary has exempted FX swaps and forwards from a clearing requirement. Council agencies would expect that Australian requirements would be harmonised with this.

4.3. Which Market Participants Should be Required to Clear?

As with the decision regarding which products to clear, Council agencies believe that deciding which participants should be subject to a clearing mandate should reflect the scope for systemic risk reduction, as well as international harmonisation. In both the European Union and the United States, exemptions appear likely to apply to many corporate end-users and smaller market participants, in part because of the smaller effect on systemic risk made by these entities. Council agencies consider a similar approach would be sensible for Australia, though any final regulatory framework would require more detail around how to define appropriate exemption criteria (say, around participant class, or thresholds of activity). It is also noted again that domestic participants may be faced with a clearing obligation if they are transacting in overseas markets, depending on the final regulatory regime that offshore jurisdictions develop.

Consistent with the regulatory proposals in major offshore jurisdictions, Council agencies would intend for most financial counterparties in Australia to be subject to any mandatory clearing requirement for designated products. As an indication of the expected scope of this, this obligation would cover transactions undertaken or facilitated (as a principal or as broker or agent) by Authorised Deposit-taking Institutions (ADIs) and Australian Financial Services Licence (AFSL) holders (again, subject to any size or class exemptions that might be considered appropriate). Some additional or alternative definitions of entity coverage may be appropriate to ensure the scope of the clearing obligation is applied evenly and to minimise regulatory arbitrage opportunities.

The Council agencies are conscious that the cross-border nature of much activity in OTC derivatives markets can make it difficult to clearly define the jurisdictional nexus for a particular contract. For instance, a transaction may be facilitated by a broker or dealer located in one jurisdiction, but the trade may ultimately be booked in the names of counterparties that are domiciled in two separate jurisdictions.

Questions around jurisdiction are therefore important in delineating what Australian regulators can consider to be the Australian OTC derivatives market. Broadly speaking, the Australian jurisdiction covers all entities domiciled in Australia, and the activity of entities that have been licensed to operate in Australia – the existing statutory and regulatory framework around this is discussed in the Annex. As some concrete, though not exhaustive, examples of what this means in practice, the Council agencies would consider the following OTC derivatives activity to be occurring within the scope of the Australian regulatory regime:

- a transaction booked between an Australian ADI and an Australian funds manager;
- a transaction booked between two Australian ADIs (say, an Australian-incorporated bank and a local branch of a foreign bank);

- a transaction booked between an Australian-incorporated ADI and a foreign bank not licensed in Australia as an ADI; or
- a transaction booked between an Australian-incorporated entity and a foreign bank not licensed in Australia, where the transaction was facilitated by a dealer or broker licensed to offer this financial service under the conditions of an AFSL, or where this service provision is otherwise governed by Australian laws (such as where the dealer or broker is acting under an exemption from the requirement to hold an AFSL).

In implementing a mandatory clearing requirement in Australia, the Council agencies are also aware that this may give rise to potential conflicts of laws and extraterritorial effects. The Council agencies also recognise there may be practical and cost issues for market participants – both domestic and international – if market participants are required to clear the same product classes through different CCPs. Similarly, it is also recognised that other jurisdictions' OTC derivatives reforms may have some extraterritorial effects on transactions and participants that Australian regulators consider to be within the Australian jurisdiction. For example, other jurisdictions may require that their local participants clear particular financial products through CCPs that have been licensed or recognised in that jurisdiction. While a detailed consideration of these issues is outside the scope of the current discussion paper, these matters will clearly be important for many market participants and for the design of Australia's policy response. The Council agencies believe that the impact of these issues can be minimised by restricting any mandatory Australian requirements to financial products that are of greatest systemic importance within Australia, rather than seeking to capture all financial products traded by Australian ADIs and AFSL holders.

4.4. Considerations Regarding OTC Derivatives Central Counterparties in Australia

4.4.1. The role of central counterparties and market functioning

As discussed in Section 2.4, CCPs can have a significant impact on the efficiency of the markets they clear. For instance, a CCP that is in a monopolistic position could potentially charge excessively for the clearing services it provides. The dynamic efficiency of the market for clearing services might also be reduced if a monopolistic incumbent had little incentive to bring innovation to the market. On the other hand, a CCP's operation is likely to exhibit increasing returns to scale, and network effects mean that its attraction to participants is likely to increase the more comprehensive are its products on offer and its base of participants. One way in which a CCP may increase its scope would be if it were to operate in other markets as well as Australia. This may have the additional benefit for local markets of straightforwardly accommodating the extensive cross-border activity that takes place between domestic and offshore counterparties. The Council agencies appreciate that this activity contributes to the overall efficiency of the domestic financial system.

However, CCPs with greater scope might have a limiting effect on competition within the local dealing market. In particular, the scale of risks managed by a large cross-product CCP might mean that – for what could well be sound reasons – direct participation was only available to a relatively small group of larger dealers. This could be detrimental for local competition for a number of reasons. As discussed in Section 3.3, activity in the Australian OTC derivatives market is concentrated in a few products, with the absolute size of these markets quite small compared to markets in North America or Europe. CCPs that were largely designed around the size and product range of these offshore markets might have participation criteria that are not well calibrated to the Australian market.

As discussed in Section 2.3.2, there may be substantial competitive advantages to being a direct member of a CCP. As such, if a CCP's membership arrangements were inappropriately scaled to the risks that need to be managed in the local market, this might unduly limit the diversity of local dealers, which over time could result in higher costs, less innovation, and greater concentration of exposures for end-users in the Australian market. A particular concern would be an outcome where no local market participant is able to clear directly, since this might see an increase in the Australian financial system's exposures to, or dependence on, offshore intermediaries.

Even if a cross-border CCP's participation criteria currently permitted some local financial institutions to become clearing members, this may change over time if these criteria were altered in response to offshore market or regulatory developments. Participation criteria that were more responsive to offshore developments may also limit the potential for new entrants to the local market. The large differential in the size of Australian OTC derivatives markets compared with major offshore markets is therefore a key consideration for Council agencies in the appropriate design of a clearing regime for Australia.

Consideration of the role of a CCP clearing an Australian OTC derivatives market must also take into account the underlying economic nature of those derivatives and their importance to the Australian financial system. Australian-dollar denominated interest rate swaps, for instance, are an integral part of the domestic funding market, operating in parallel to physical borrowing and lending markets. The duration of these contracts can be quite long, meaning that counterparty risk exposures might need to be managed for several years or more. Forward contracts for commodities, by contrast, serve mainly as a risk management tool for producers and purchasers in the face of short- to medium-term price uncertainty. These considerations will inform the assessment of a CCP's design and functioning, such as payment or settlement arrangements, or location of facilities or legal domicile. In some circumstances this may point to the desirability of a domestic CCP, whereas for other markets an offshore CCP may be appropriate.

4.4.2. Client clearing arrangements

Whatever the participation criteria of a CCP, it can be expected that direct participation will always be restricted to a subset of market participants. This is appropriate, to the extent it is necessary for the CCP's risk management arrangements, so long as access criteria are determined based on fair, transparent and objective risk-based criteria. But for market participants who are unable or unwilling to join as direct members, mandatory clearing of certain OTC derivatives transactions should not result in an increase in counterparty risks due to a requirement to clear through a direct participant. As such, a CCP that is clearing mandated OTC derivatives should have client clearing arrangements that ensure, as much as possible, that equivalent protections are given to both direct and indirect participants.

A crucial issue here is the treatment of clients' margin monies in the event of a clearing participant's default. As noted in Sections 1.3.1 and 2.3.2, increased attention is being given to the portability and segregation of client assets, with these being configured differently in Europe and the United States based on the prevailing clearing structures in use. The Council agencies, too, are keen to ensure that client positions can be protected to the extent possible in the case of a clearing participant default or, indeed, in the event of a CCP's default. For CCPs operating in Australia it will be important, therefore, to understand whether these arrangements can be implemented given the existing Australian insolvency regime, or whether changes to aspects of this regime might be necessary. This is also a question that the agencies are considering in the context of the revised CPSS-IOSCO recommendations with regards to central counterparties.

4.4.3. Regulatory and jurisdictional considerations

As discussed in the Annex, the existing Australian regulatory regime provides for the oversight of CCPs operating within Australia. Any CCP that was authorised to clear OTC derivatives would be subject to that regime.[45] Given the relatively small size of the Australian market compared with the largest offshore markets, it is possible that clearing could be undertaken by a CCP located and domiciled offshore and which was also clearing other countries' markets. In this situation, Australian regulators would not be likely to have primary oversight responsibilities – this would instead sit with authorities in the country in which the CCP was based. As discussed in Section 2.3.1, the legal arrangements of an offshore CCP would most likely mean that its default resources (such as margin monies and pooled default funds) and default resolution processes would be governed by the laws of its home jurisdiction rather than the laws of Australia.

Australian authorities would naturally look to establish co-operative oversight arrangements in this situation. Nonetheless, despite mutual best endeavours, there may be doubts over the effectiveness of any directions to the CCP from Australian regulators in crisis situations, and the potential also exists for any such directions to be in conflict with those of the CCP's home-country authorities. A CCP servicing multiple jurisdictions, with a potentially large number of authorities requiring some oversight, is an even more complex possibility. If all regulators were looking to actively participate in oversight arrangements, there is a danger that the effectiveness of oversight diminishes as a CCP expands its services into new jurisdictions and the number of regulators involved increases. There is also an increased potential for competing, if not conflicting, requirements across regulators, which may be particularly problematic in a crisis situation. To date, the establishment of cross-border oversight and crisis management arrangements for CCPs has received only very preliminary consideration in international fora, in part because CCP activity has, until recently, largely taken place within national boundaries. The push for central clearing of OTC derivatives, and the cross-border nature of much of this activity, is bringing to the fore the need for global regulators to develop appropriate arrangements to manage cross-border considerations. To be fully effective, though, it may be that these arrangements need to be legally binding on national authorities, which would require considerable time to be implemented. The history of developing similar arrangements for cross-border banking groups highlights the complexities of these issues, in part reflecting differences in insolvency regimes across countries.[46]

Based on jurisdictional considerations, the Council agencies' predisposition is to be cautious with regards to imposing mandatory clearing requirements on Australian participants that have the effect of requiring them to use offshore CCPs, particularly in relation to products that are systemically important within the domestic financial system. It is acknowledged that the prospect of a CCP getting into severe financial difficulties is remote. As with other prudentially regulated institutions, a CCP would only be licensed in Australia if it operated to a very high standard, with this reinforced by ongoing regulatory oversight; the inherent design characteristics of CCPs also reduce the prospect of a failure. However, as noted in Section 2.4.1, a residual risk always remains, and consequences could be significant. It is also unknown if the underlying risks within the financial system – and partly absorbed by CCPs – will change as an unintended consequence of the international push for central clearing of OTC derivatives.

45 A separate review of some aspects of this regime is currently underway by the Council agencies, following a request by the Australian Government; more information is available at: http://www.treasurer.gov.au/DisplayDocs.aspx?doc=pressreleases/2011/030.htm&pageID=003&min=wms&Year=&DocType=0.

46 For an update on recent progress on cross-border arrangements regarding systemically important financial institutions, see FSB (2011b). For a report on lessons learned regarding crisis management of cross-border banking groups during the recent financial crisis, see BCBS (2010c).

If mandatory clearing of OTC derivatives was implemented in Australia, this would effectively dictate to local market participants that they take on the counterparty risk of a CCP or its clearing members, and potentially other contingent liabilities related to CCP membership. The Council agencies accept that they should be directly accountable for the regulatory outcomes of this policy. Given this, the agencies note that, for a number of legal and operational reasons, and given the current state of cross-jurisdictional regulatory arrangements, they presently have a greater capacity to oversee a CCP, and to assist in financial or operational crisis management, where that CCP is domiciled in Australia.

A related public policy question is whether it would be an appropriate outcome if it were mandatory for Australian participants to clear (either directly or indirectly) through a CCP whose legal arrangements were based in a foreign jurisdiction. Such an outcome may require Australian-based direct clearing participants, in agreeing to be bound by the CCP's membership rules, to submit to foreign laws and jurisdiction. Similarly, Australian-based indirect clearing participants may be reliant on the foreign jurisdiction's legal framework around bankruptcy, and account segregation and portability. In each of these situations, understanding and working within a foreign jurisdiction's legal framework may impose a significant burden on participants, with this burden likely to sharply increase if a clearing-related matter was to be litigated. However, this also needs to be weighed against the relative costs to participants of possible direct, indirect, onshore or offshore clearing arrangements.

5. Proposed Clearing Regime Design and Application

5.1. Proposed Elements of a Clearing Regime for OTC Derivatives in Australia

The preceding analysis lays out some of the challenges facing Australia in implementing a requirement for standardised OTC transactions to be centrally cleared. The Council agencies have not concluded what such a regime should look like. However, a preliminary position is that a regime for mandatory central clearing of OTC derivatives in Australia should contain the following elements:

1. Any mandatory requirement that a class of OTC derivatives be centrally cleared should reflect the following factors:
    a. the potential reduction of systemic risk that might result from this move;
    b. the viability of central clearing of that product class; and
    c. the international harmonisation of clearing requirements across product classes.
2. Similarly, the determination of the market participants to whom a mandatory clearing requirement would apply should reflect:
    a. the potential contribution to systemic risk of these participants; and
    b. harmonisation with international requirements.
3. The process for determining which products should be subject to a mandatory clearing requirement should allow for both the 'bottom-up' and 'top-down' approach, though it would be expected that the detail of developments would be predominantly industry-led.
4. Regarding CCPs operating in the domestic OTC derivatives market, static and dynamic efficiency must be considered as well as stability outcomes, recognising that there may be some conflicting considerations. In particular:
    a. a CCP's participation criteria may influence the degree of dealer competition and service provision within Australian financial markets;
    b. a CCP's participation criteria may alter concentrations of exposures and other risks within the Australian financial system;
    c. a CCP's participation criteria should not undermine its capacity to appropriately manage the risks it faces;
    d. economies of scale and network effects can reduce the scope for competition in clearing services;

e. the efficiency and viability of a CCP is likely to increase the more transactions it processes and the more netting opportunities it provides participants; and

f. Council agencies will need to consider how a mandatory clearing requirement might interact with the market for clearing services, and whether provision of clearing is provided in an efficient manner to market participants.

5. Reflecting jurisdictional considerations, Council agencies see merit in Australian-domiciled clearing solutions, particularly where a market is systemically important, for the following reasons:

   a. having Australian agencies as the primary regulators of a CCP operating in the domestic market provides superior policy outcomes with respect to regulatory clarity, transparency and accountability;

   b. Australian regulators' capacity to intervene in crisis management scenarios is likely to be more straightforward with regards to a local CCP; and

   c. in enforcing a mandatory clearing requirement, undertaking clearing through Australian-domiciled CCPs avoids the prospect of Australian regulation having an outcome that would require Australian entities to submit to a foreign jurisdiction, if that was a consequence of directly or indirectly participating in a foreign-domiciled CCP.

6. It is appropriate that cross-margining or interoperability arrangements be considered, subject to appropriate regulatory oversight and approval. This provides scope to preserve netting benefits across multiple CCPs for market participants with large or complex clearing needs.

7. Authorities should continue to be open to licensing CCPs domiciled in foreign jurisdictions, particularly for the clearing of non-systemically important markets.

5.2. Proposed Initial Application of this Regime

Given the discussion of Australian OTC derivatives market activity in Section 3.2, a product class that would appear likely to meet the tests set out above is Australian dollar-denominated interest rate derivatives. This reflects the following considerations:

- this market is fundamental to domestic funding markets and the hedging of interest rate risk among Australian borrowers and lenders, and therefore the stability and efficiency of the Australian financial system;
- these instruments are widely used across a multitude of both sell-side and buy-side domestic counterparties;
- the duration of counterparty risk exposures of these instruments is long-lived in many cases;
- the dominant products, such as forward rate agreements, overnight indexed swaps and interest rate swaps, are all relatively standardised, suggesting they are amenable to central clearing;
- there would appear to be significant scope to net down some large gross outstanding positions held by institutions; and
- interest rate derivatives appear likely to be mandatorily clearable in offshore jurisdictions.

A clearing requirement might be imposed for this market if a CCP was to be licensed to clear this product, or if relevant agencies came to the conclusion that it should be clearable. Under the 'bottom-up' approach, industry participants may engage with an existing or new CCP operator to develop a clearing solution for this market.

In the event that a 'top-down' approach was taken, analysis and consultation undertaken by regulators may conclude that clearing these products should be mandatory. In that situation, regulators would investigate reasons for why central clearing had not yet been implemented, and would explore various regulatory avenues with participants to move the market in that direction.

In either case, the Council agencies consider that there may be a case for an Australian-domiciled CCP to clear this market. The agencies recognise that this may have detrimental effects on some market participants' capacity to net across products that might be cleared through other CCPs. On the other hand, default and crisis management arrangements might be more straightforward and certain in a local CCP. In the Council agencies' view, these domestic stability and jurisdictional considerations should be given more weight in such a systemically important market (which is consistent with making it subject to a mandatory clearing regime).

Institutions or firms (such as many non-financial institutions) that predominantly hedge using only Australian dollar-denominated interest rate derivatives are likely to be largely indifferent to some of these netting considerations, and therefore a local CCP is unlikely to impose significantly greater collateral costs for them. For other participants, though, a reduction in cross-currency or cross-product netting opportunities may result in increased costs due to additional collateral requirements. The Council agencies would be concerned if a consequence of this was a serious disruption to the functioning of domestic markets. One way to mitigate this, and to retain or create netting efficiencies for more active market participants, would be through the Council agencies considering appropriately designed arrangements for links between CCPs (with a view to minimising risks).

6. Consultation Process and Questions

6.1. Consultation Process

The Council agencies have issued this paper to encourage all interested stakeholders to engage in a thorough discussion about implementing central clearing of OTC derivatives markets in Australia. The agencies recognise that many of the issues are highly complex, with uncertainty perhaps heightened as a result of related ongoing developments in international markets. The agencies also recognise, though, that not all stakeholders' interests may be aligned.

The Council agencies welcome comments on any matters discussed in this paper. As a basis for discussion, a number of questions have been suggested below, to which stakeholders might wish to respond.

6.2. Suggested Questions

6.2.1. The potential clearability of OTC derivatives

Q1. Do you consider the product characteristics of any OTC derivatives classes traded by Australian market participants make them amenable to central clearing in general? If so, what classes would you include, and for what reasons? For which classes do you think central clearing is inappropriate, and for what reasons?

Q2. What OTC derivatives traded in Australia would you consider as feasible to be centrally cleared?

Q3. Do you agree with this paper's suggestion that Australian dollar-denominated interest rate derivatives traded in Australia have the volume and characteristics to be viably centrally cleared?

Q4. What would be the costs of moving certain OTC derivatives transactions to central clearing? Please provide as much data or information as possible to illustrate this.

6.2.2. Mandatory clearing requirements

Q5. Do you agree or disagree with the proposed criteria for deciding whether a class of OTC derivatives should be mandatorily cleared? (See point 1 under Section 5.1)

Q6. Do you agree or disagree with the proposed criteria for deciding whether a class of market participants should be subject to a mandatory clearing requirement? (See point 2 under Section 5.1)

Q7. What, if any, exemptions for either products or participants do you think the Council agencies should be considering, and for what reasons?

6.2.3. OTC derivatives central counterparties

Q8. Do you agree or disagree with the agencies' proposition that CCPs clearing OTC derivatives markets that are systemically important to Australia should be domiciled in Australia, particularly for instruments denominated in Australian dollars?

Q9. What would be the impact on the local market of mandatory clearing through a domestic CCP? What might be the advantages or disadvantages of clearing through an offshore-domiciled CCP? Please discuss all points where you agree or disagree, in as much detail as possible. Where available, please provide quantitative data to illustrate the impact of various CCP configurations on the costs and risks of individual market participants or the Australian market as a whole.

Q10. Do you consider any changes need to be made to Australian law or regulation to improve a CCP's arrangements for the segregation and portability of client accounts?

Q11. Do you consider any other changes need to be made to Australian law or regulation to improve the handling of collateral posted by market participants for positions cleared offshore?

Q12. Are there any other changes to the regulation of CCPs that should be considered that are particular to the clearing of OTC derivatives?

Q13. Do you agree that interoperability among OTC derivatives CCPs should be encouraged?

Q14. Do you agree that a mandatory clearing requirement might have consequences for efficient outcomes in the market for clearing services? How should Council agencies and market participants look to manage any adverse effects in this area?

6.2.4. Jurisdictional and other matters

Q15. Are there any legal impediments to mandating the clearing of OTC derivatives and the use of CCPs? Are there any legal impediments to mandating the use of a CCP where that CCP is domiciled in a foreign jurisdiction?

Q16. Are there any extraterritorial effects of regulatory reform underway in foreign jurisdictions that should be considered in developing a clearing regime for Australia?

Q17. Are there any other changes to the existing regulatory framework for the Australian financial system that would be desirable to accommodate a move to central clearing of OTC derivatives?

Q18. In the absence of a domestic mandatory clearing requirement, how would Australian participants respond to changes in capital treatment of non-cleared OTC derivatives and global market developments (including the increasing use of CCPs by global dealers)? Do Australian participants expect to centrally clear transactions in products which Australian law does not require them to clear? If so, what is the motivation for centrally clearing these products (e.g. to avoid higher capital charges, offshore jurisdictional requirements, commercial pressure)?

6.3. Next Steps

The Council agencies will be hosting a number of roundtable discussions over the period ahead, and will arrange individual meetings as appropriate. A list of meeting attendees will be made public.

Written submissions are also welcomed; all submissions and correspondence received will be made public, unless specifically requested to be treated as confidential.

The Council agencies request that formal submissions and comments in response to this discussion paper be received by **1 September 2011**. (The agencies have decided to extend this deadline from the original due date of 5 August 2011.)

Please direct all correspondence and other requests as follows:

Email:

OTCDConsultation@rba.gov.au

Address:

'OTC Derivatives Central Clearing Consultation'

Reserve Bank of Australia

GPO Box 3947

Sydney NSW 2001

AUSTRALIA

Annex

The Current Regulatory Regime for OTC Derivatives in Australia

The Australian regulatory regime provides a comprehensive framework underpinning the soundness of the domestic OTC derivatives market. Financial intermediaries are required to be licensed with respect to their interactions with counterparties, and most are prudentially regulated as well. Centralised trading platforms and other infrastructure that are used by market participants are also overseen by regulators.

Market intermediaries

Under the *Corporations Act 2001*, firms or persons that carry out financial services within Australia are generally required to have received an Australian Financial Services Licence (AFSL) from ASIC. Alternatively, they may rely on an exemption from the requirement to hold an AFSL – this arrangement is in place for many overseas-based entities providing financial services to Australian wholesale clients, where ASIC considers that the overseas financial service provider is subject to equivalent regulation in its home jurisdiction. In relation to OTC derivatives, the types of services that a firm might be providing could include (though may not be limited to) financial product advice, dealing in a financial product, making a market in a financial product, or custodial or depository services. In order to receive and maintain an AFSL, entities need to demonstrate that they satisfy a range of business conduct, governance, risk control, and resourcing measures. The specific requirements will greatly depend on the scale of an entity's business and the type of counterparties it is dealing with: higher requirements will typically apply where its business is more complex or its counterparties are less sophisticated.

In general, the AFSL regime sets only minimum financial requirements, and does not impose prudential standards. Instead, APRA administers Australia's prudential regime, through which the ongoing adequacy of intermediaries' financial resources are measured against the market, credit, liquidity and operational risks they face. As discussed in Section 3.2, the main OTC derivatives dealers in Australia are members of domestic or foreign banking groups. Domestically incorporated banks are fully regulated by APRA; local branches of foreign banks are also regulated, though a greater reliance is placed on these banks' home-country regulators.

Although local branches or subsidiaries of foreign banks may be the licensed entity acting as a dealer in the Australian market, it is often the case that the local entity is not the name of the legal entity in which an OTC derivatives transaction is booked. Instead, a transaction might be booked in the name of a foreign bank's headquarters (or a major subsidiary). In this way, an internationally active bank can consolidate large parts of its global derivatives activity in a single entity, which can provide significant netting and capital benefits. For transactions undertaken in Australia, though, this can mean that a significant amount of domestic activity is booked against a counterparty not domiciled in Australia. The AFSL licensing regime provides some protections around this by requiring that an Australian AFSL holder entering into derivatives

as a principal must meet minimum financial requirements imposed by ASIC, while market participants will typically undertake creditworthiness checks and ensure contractual and collateral arrangements are legally robust. Well-established cross-border banking and securities transfer arrangements also mean that exchanges of collateral against market movements typically proceed smoothly. However, as demonstrated by events of recent years, in times of market turmoil – and particularly in the event of an offshore counterparty default – this cross-border interdependence can be problematic.

Market infrastructure

Since a large part of the attractiveness of OTC derivatives is their capacity to be carefully tailored to an individual counterparty's needs, traditionally this market has not made much use of centralised infrastructure. However, for some more standardised products, the benefits of trading platforms have become apparent to some market participants. In general, under Part 7.2 of the Corporations Act, a market facility such as a trading platform will need to be granted an Australian Market Licence (AML) for it to operate in the domestic market. Exemptions from the requirement to hold an AML have been granted, however, for certain types of facilities that are used solely by wholesale market participants. As with the AFSL regime, for a market operator to be licensed, certain business conduct, governance, risk control, and resourcing requirements must be met, and the operator must demonstrate that its market is fair, orderly and transparent. In the first instance, ASIC has responsibility for considering an application for a market licence, and is also responsible for the ongoing assessment of an operator. But the granting and revocation of an AML is a decision of a minister of the Australian government which is made subject to the minimum requirements set out in the Corporations Act. Over time, and given international trends, it is likely that the OTC derivatives market will make greater use of these sorts of market facilities.

In order to operate a CCP in Australia, an operator must have an Australian Clearing and Settlement Facility Licence (CSFL), as set out under Part 7.3 of the Corporations Act or receive an exemption from this requirement. The regulation of these facilities is jointly overseen by ASIC and the Reserve Bank, whose role is to consider the potential effects of clearing and settlement facilities on overall financial and payment system stability. The granting and revocation of a CSFL is at the discretion of a minister of the Australian government. As with market operators, a clearing and settlement facility must satisfy certain business conduct, governance, risk control, and resourcing requirements. In undertaking the assessment and oversight of these facilities, ASIC and the Reserve Bank are guided by international recommendations set out by CPSS and IOSCO; a new version of the 'Principles for Financial Market Infrastructures' is currently open for consultation.[47] In part, the revisions to these principles reflect the increasing recognition of the systemic importance of clearing and settlement facilities; with respect to CCPs, it also acknowledges that their systemic importance is growing due to measures (such as the G20 commitment) that encourage or mandate the use of CCPs.

47 See CPSS-IOSCO (2011).

References

APRA (Australian Prudential Regulation Authority), ASIC (Australian Securities and Investments Commission) and RBA (Reserve Bank of Australia) (2009), 'Survey of the OTC Derivatives Market in Australia', May, available at: http://www.apra.gov.au/Media-Releases/upload/Survey-of-the-OTC-Derivatives-Market-in-Australia-report.pdf.

ASIC and RBA (2009), 'Review of Participation Requirements in Central Counterparties', March, available at: http://www.rba.gov.au/payments-system/clearing-settlement/review-requirements/rprcc-032009.pdf.

BCBS (Basel Committee on Banking Supervision) (2010a), 'Basel III: A global regulatory framework for more resilient banks and banking systems', December, pp 29–51, available at: http://www.bis.org/publ/bcbs189.pdf.

BCBS (2010b), 'Capitalisation of Bank Exposures to Central Counterparties – Consultative Document', December, available at: http://www.bis.org/publ/bcbs190.pdf.

BCBS (2010c), 'Report and Recommendations of the Cross-border Bank Resolution Group', Bank for International Settlements, March, available at: http://www.bis.org/publ/bcbs169.pdf.

Bernanke B (2011), 'Clearinghouses, Financial Stability, and Financial Reform', Speech at the Federal Reserve Bank of Atlanta Financial Markets Conference, Stone Mountain, Georgia, 4 April, available at: http://www.federalreserve.gov/newsevents/speech/bernanke20110404a.pdf.

Chander A and R Costa (2010), 'Clearing Credit Default Swaps: A Case Study in Global Legal Convergence', University of California (Davis) Legal Studies Research Paper No 211, March, available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1576765.

Counterparty Risk Management Policy Group (2005), 'Toward Greater Financial Stability: A Private Sector Perspective', available at: http://www.crmpolicygroup.org/crmpg2/docs/CRMPG-II.pdf.

CPSS (Committee on Payment and Settlement Systems) (1998), 'OTC Derivatives: Settlement Procedures and Counterparty Risk Management', CPSS Publication No 27, Bank for International Settlements, September, available at: http://www.bis.org/publ/cpss27.pdf.

CPSS (2007), 'New Developments in Clearing and Settlement Arrangements for OTC Derivatives', CPSS Publication No 77, Bank for International Settlements, March, available at: http://www.bis.org/publ/cpss77.pdf.

CPSS (2010), 'Market structure developments in the clearing industry: implications for financial stability', CPSS Publications No 92, Bank for International Settlements, November, available at: http://www.bis.org/publ/cpss92.pdf.

CPSS-IOSCO (International Organization of Securities Commissions) (2010), 'Guidance on the application of the 2004 CPSS-IOSCO Recommendations for Central Counterparties to OTC derivatives CCPs – Consultative Report', CPSS Publications No 89, Bank for International Settlements, May, available at: http://www.bis.org/publ/cpss89.pdf.

CPSS-IOSCO (2011), 'Principles for Financial Market Infrastructures – Consultative Report', CPSS Publications No 94, Bank for International Settlements, March, available at: http://www.bis.org/publ/cpss94.pdf.

Duffie D (2010), 'The Failure Mechanics of Dealer Banks', *Journal of Economic Perspectives*, Vol 24 No 1 (Winter), pp 51–72, available at: http://www.aeaweb.org/articles.php?doi=10.1257/jep.24.1.51.

Duffie D and H Zhu (2011), 'Does a Central Clearing Counterparty Reduce Counterparty Risk?' *Review of Asset Pricing Studies* (forthcoming), working paper version available at: http://www.darrellduffie.com/uploads/pubs/DuffieZhu2011.pdf.

Duffie D, A Li and T Lubke (2010), 'Policy Perspectives on OTC Derivatives Market Structure', Federal Reserve Bank of New York Staff Paper No 424 (March), available at: http://www.fednewyork.org/research/staff_reports/sr424.pdf.

European Central Bank and Federal Reserve Bank of Chicago (2007), 'The Role of Central Counterparties', ECB Conference Paper, July, available at: http://www.ecb.int/pub/pdf/other/rolecentralcounterparties200707en.pdf.

European Commission (2009), 'Commission Staff Working Paper Accompanying the Commission Communication: Ensuring Efficient, Safe and Sound Derivatives Markets', July, available at: http://ec.europa.eu/internal_market/financial-markets/docs/derivatives/report_en.pdf.

FSB (Financial Stability Board) (2010), 'Implementing OTC Derivatives Market Reforms', October, available at: http://www.financialstabilityboard.org/publications/r_101025.pdf.

FSB (2011a), 'OTC Derivatives Market Reforms: Progress report on implementation', April, available at: http://www.financialstabilityboard.org/publications/r_110415b.pdf.

FSB (2011b), 'Progress in the Implementation of the G20 Recommendations for Strengthening Financial Stability', April, available at: http://www.financialstabilityboard.org/publications/r_110415a.pdf.

Financial Stability Forum (2008), 'Report on Enhancing Market and Institutional Resilience', April, available at: http://www.financialstabilityboard.org/publications/r_0804.pdf.

Hills B, D Rule and S Parkinson (1999), 'Central Counterparty Clearing Houses and Financial Stability', Bank of England *Financial Stability Review*, June, pp 122–134, available at: http://www.bankofengland.co.uk/publications/fsr/1999/fsr06art6.pdf.

Jackson J and M Manning (2007), 'Comparing the Pre-settlement Risk Implications of Alternative Clearing Arrangements', Bank of England Working Paper No 321, April, available at: http://www.bankofengland.co.uk/publications/workingpapers/wp321.pdf.

Joint Regulatory Authorities of LCH.Clearnet Group (2008), 'Investigation of risks arising from the emergence of multi-cleared trading platforms', July, available at: http://www.dnb.nl/en/binaries/Investigation%20of%20risks%20arising%20from%20the%20emergence%20of%20multi-cleared%20trading%20platforms_tcm47-216876.pdf.

Manning M, A Heath and J Whitelaw (2010), 'The Foreign Exchange Market and Central Counterparties', RBA *Bulletin*, March, pp 49–57, available at: http://www.rba.gov.au/publications/bulletin/2010/mar/pdf/bu-0310-8.pdf.

Norman P (2011), *The Risk Controllers: Central Counterparty Clearing in Globalised Financial Markets*, Wiley, Chichester.

Pirrong C (2011), 'The Economics of Central Clearing: Theory and Practice', ISDA Discussion Papers Series No 1, May, available at: http://www2.isda.org/attachment/MzE0NA==/ISDAdiscussion_CCP_Pirrong.pdf.

RBA (2009), 'Box B: Central Clearing of Over-the-counter Credit Derivatives', *Financial Stability Review*, March, pp 69–71, available at: http://www.rba.gov.au/publications/fsr/boxes/2009/mar/b.pdf.

Singh M and J Aitken (2009), 'Counterparty Risk, Impact on Collateral Flows and Role for Central Counterparties', IMF Working Paper 09/173, available at: http://www.imf.org/external/pubs/ft/wp/2009/wp09173.pdf.

Tucker P (2011), 'Clearing Houses as System Risk Managers', Speech at the DTCC-CSFI Post Trade Fellowship Launch, London, 1 June, available at: http://www.bankofengland.co.uk/publications/speeches/2011/speech501.pdf.