

# OTC Derivatives Reforms and the Australian Cross-currency Swap Market

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Reforms to improve the management of counterparty credit risk in over-the-counter (OTC) derivatives markets are underway globally. A key pillar of the reforms is the migration of these markets to central counterparties (CCPs), while higher capital charges and increased collateralisation will apply to derivatives that remain non-centrally cleared. One class of OTC derivatives that could be significantly affected by these reforms are cross-currency swaps. These instruments are particularly important to the Australian financial system because Australian banks raise a significant proportion of their funding by issuing foreign currency bonds in offshore markets and using cross-currency swaps to hedge the associated foreign exchange (FX) risk. No CCP yet offers a central clearing solution for cross-currency swaps, which means that Australian banks will continue to manage counterparty credit risk in this market on a bilateral basis for the time being. Regardless of whether cross-currency swaps are centrally or non-centrally cleared, it is important when implementing the reforms in this market to examine how market participants will adjust to the new environment.

## Introduction

The use of OTC derivatives has grown considerably in recent decades, in part reflecting the flexibility of these instruments in hedging risks in specific ways. Cross-currency swaps have become an important hedging tool for the Australian financial system, with Australian banks using these derivatives extensively to hedge the FX risks associated with their offshore borrowing.

Although commonly used to hedge a specific risk, OTC derivatives also introduce counterparty credit risk. In the event that a counterparty to a derivative contract defaulted, obligations due under the contract to the non-defaulted counterparty might not be met. Moreover, the non-defaulted counterparty could incur additional costs in replacing the contract that it had with the defaulted counterparty, most likely by having to enter into a replacement contract at a less favourable price.

Users of OTC derivatives are currently facing significant reforms to these markets. These stem from regulatory concerns regarding transparency and counterparty risk management practices in OTC derivatives markets, including insufficient collateralisation of exposures.<sup>1</sup> These concerns intensified following the onset of the global financial crisis. Following commitments by the leaders of the G20 group of countries (G20 2009, 2011), regulators are in the process of migrating standardised OTC derivatives to CCPs and introducing mandatory requirements for the collateralisation of derivatives that remain outside CCPs.

CCPs have been used for well over a century to concentrate and manage counterparty credit risk centrally and thereby facilitate anonymous trading

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<sup>1</sup> Some collateralisation of exposures is commonly performed under credit support annexes (CSAs) in the legal documentation that governs the obligations between counterparties. This collateralisation typically only covers 'current exposure' arising from observed price movements, and rarely involves the posting of collateral to cover further losses incurred during the closing out of positions in the event of a counterparty default.

on exchanges. Through the process of novation, a CCP assumes the obligations associated with individual transactions, effectively becoming the buyer to every seller, and seller to every buyer. CCPs use a number of controls to manage the resulting credit risk exposure. These include marking to market cleared positions at least daily, and requiring participants to post both variation margin and initial margin against their cleared positions. Typically, the size of this initial margin requirement is calibrated to cover the loss that could be incurred in replacing the position should a participant default in normal market conditions, while the variation margin reflects observed price movements during the life of the contract. For losses in extreme scenarios, a CCP can access a pool of financial resources to which all participants have contributed (i.e. a default fund). A CCP's procedures for managing a default and accessing margin and other default resources are transparent and enforceable. As a central hub for participants, a CCP also promotes transparency and standardisation in a market, and provides a focal point for regulation and oversight.

In a number of jurisdictions, mandatory central clearing requirements are being imposed through legislation. Incentives for central clearing are also being established through higher prudential capital charges on bilateral derivatives exposures relative to centrally cleared derivatives exposures. In respect of collateralisation of bilateral exposures, the Working Group on Margin Requirements (WGMR) – a joint group of the Basel Committee on Banking Supervision (BCBS) and the International Organization of Securities Commissions (IOSCO) – is developing principles for margin requirements on non-centrally cleared derivatives, while the United States and the European Union have already made provisions for such requirements in their respective legislative frameworks.

In Australia, legislation has been put in place to allow the Australian Government, under advice from regulators, to impose mandatory central clearing requirements on prescribed classes of OTC derivatives.<sup>2</sup> The Australian Prudential Regulation Authority (APRA), the Australian Securities and Investments Commission (ASIC) and the Reserve Bank of Australia (RBA) are periodically assessing Australian OTC derivatives markets and making recommendations about the need for mandatory requirements to the Australian Government.<sup>3</sup> The regulators' first assessment under this framework was published in October 2012. It concluded that there are strong in-principle benefits from the use of CCPs, particularly in systemically important OTC derivatives markets such as those for single-currency interest rate swaps and, potentially, cross-currency swaps (APRA, ASIC and RBA 2012). It also concluded that an industry-led move to central clearing is preferable to mandatory requirements in the first instance.

The market assessment also acknowledged, however, that central clearing solutions for cross-currency swaps did not exist at present. As a consequence, the benefits of central clearing may not be realised in this market, at least in the short term. Instead, users of these derivatives will have to meet new capital and collateral requirements for non-centrally cleared derivatives.

This article describes the mechanics of cross-currency swaps and their role in the Australian financial system. It also discusses some of the issues arising from the application of the OTC derivatives reforms to cross-currency swaps markets, including the amenability of cross-currency swaps to central clearing.

2 The framework also allows for the imposition of mandatory trade reporting and trade execution requirements.

3 The regulators have also released a policy statement on their approach to considering mandatory central clearing requirements. See APRA, ASIC and RBA (2013).

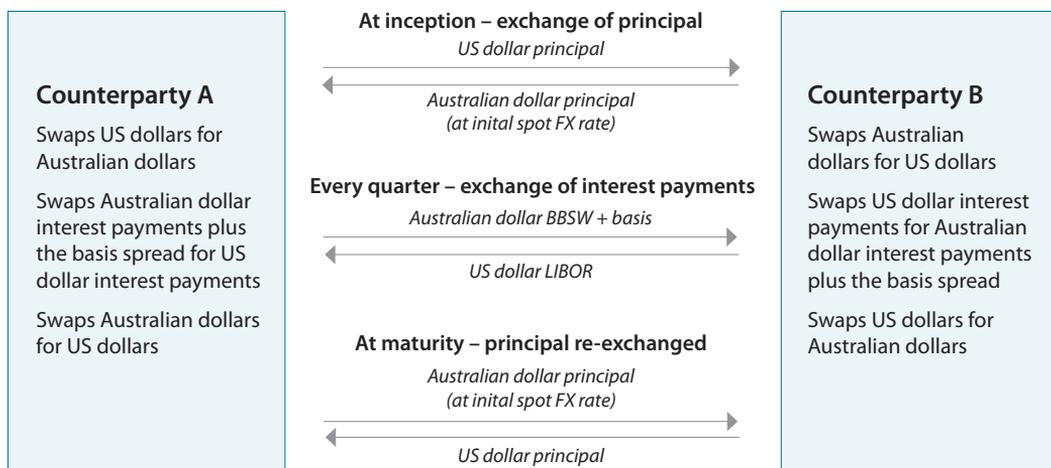
## What are Cross-currency Swaps?

Cross-currency swaps are OTC derivatives that involve the exchange of principal in different currencies and the payment of interest in one currency and the receipt of interest in another currency at a fixed exchange rate determined at the contract's initiation. These interest payments occur at specified intervals over the term of the swap. Due to their structure, cross-currency swaps are ideally suited to hedging the FX risk associated with longer-term debt securities issued in foreign currencies. FX swap and forward contracts are generally used to hedge FX risk at shorter maturities (typically less than 1 year).<sup>4</sup>

Cross-currency swaps come in a number of forms, but the most prevalent contract is the cross-currency basis swap where counterparties exchange floating interest rate payments, tied to benchmark money market rates, at set intervals over the term of the swap. For example, in an Australian dollar–US dollar cross-currency basis swap, the counterparties initially exchange principal in the two currencies at the

spot exchange rate (Figure 1). The counterparties then regularly exchange interest payments of Australian dollars linked to the bank bill swap rate (BBSW) and interest payments in US dollars linked to the US dollar LIBOR rate. Along with these regular payments, the counterparties exchange what is known as the cross-currency basis swap spread, which is the cost of entering into the contract. By market convention, the basis spread is added to the reference benchmark rate used to determine the regular interest payments by the counterparty making non-US dollar payments. The basis spread is determined in the market by the balance between demand and supply for cross-currency swaps for the relevant currency pair. Typically, the basis spread in Australian dollar–US dollar cross-currency basis swaps is positive and is therefore paid by the counterparty making the regular Australian dollar payments, although this counterparty receives the basis spread on those occasions when it is negative. At the end of the swap's term, the two counterparties

**Figure 1**  
Cash Flows in a Stylised Cross-currency Swap



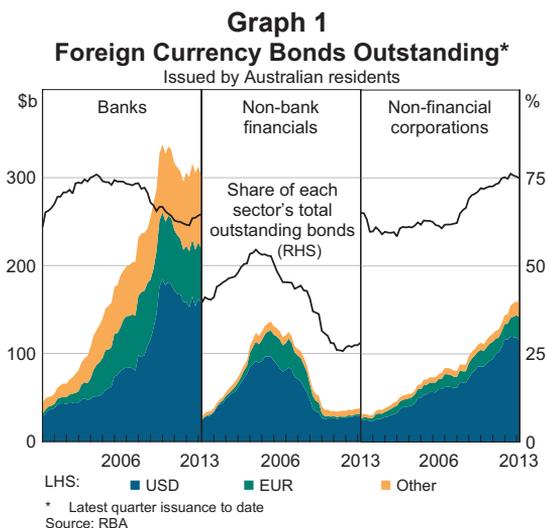
Source: RBA

4 The focus in this article is on cross-currency swaps because they are likely to be significantly affected by the OTC derivatives reforms and are a major tool for managing longer-dated FX risk in the Australian financial system. FX swaps and forwards are also used extensively, with a focus on hedging shorter-term FX risk, but are likely to be less affected by the reforms – see ‘Implications of OTC Derivatives Reforms’ below for more detail.

return the principal to each other at the exchange rate that had prevailed at the initiation of the contract.<sup>5</sup> An Australian resident issuing a floating rate US dollar bond offshore can enter into a cross-currency basis swap (with maturity and frequency of regular payments matching that of the bond) to eliminate the interest rate risk and FX risk associated with the stream of coupon payments on the bond and the FX risk on the repayment of the principal at maturity.<sup>6</sup>

### How are Cross-currency Swaps Used?

Australian resident non-government entities raise a significant portion of their wholesale long-term funding by issuing foreign-currency denominated bonds offshore (Graph 1). Foreign currency bonds account for around 60 per cent of the outstanding bonds issued by Australian non-government resident entities. This share has remained largely unchanged for most of the past decade. The majority of these bonds are issued in US dollars, with euro-denominated issuance comprising most of the remainder. Australian residents also issue Australian dollar bonds in offshore markets, although these only make up around 3 per cent (\$23 billion) of offshore bonds outstanding. Most foreign-held Australian dollar-denominated debt liabilities are issued in the domestic bond market (a large share



of these are bonds issued by the Australian and state governments).

The issuance of foreign currency debt into offshore bond markets broadens Australian entities' funding base. This provides them with important diversification benefits and gives them access to markets that can absorb large issues at relatively attractive prices.<sup>7</sup> However, it also exposes them to FX risk because the revenue streams of the Australian issuers are predominantly denominated in Australian dollars, while the interest and principal repayments that arise from their foreign currency bond issuance are not. FX derivatives – and more specifically, cross-currency swaps – allow this risk to be effectively eliminated and have become a key element of the offshore funding of Australian issuers. Furthermore, this hedging allows Australian residents to raise funds in the currency they require – Australian dollars – while accessing liquid and deep foreign bond markets. The evidence indicates that the vast bulk of the FX risk from the foreign currency issuance is indeed hedged (D'Arcy, Shah Idil and Davis 2009). According to the Australian Bureau of Statistics Survey of Foreign Currency Exposure, in 2009 around 95 per cent of Australian banks' foreign

5 Cross-currency swaps can also be structured with resetting principal. In this case, the principal of the cross-currency swap is adjusted periodically at the times of the regular exchanges of interest payments between the counterparties (the reset dates) to reflect movements in the exchange rate. Typically, the principal on the US dollar leg of the swap is the one that is reset. The counterparty against which the exchange rate has moved since the previous reset date pays the other counterparty a cash flow equal to the value of the change in principal. At maturity, the principal is exchanged at the prevailing exchange rate. This practice partially mitigates the counterparty risk in a cross-currency swap because, rather than waiting for the swap maturity to realise the gains or losses arising from exchange rate movements, the exchange rate gains or losses are transferred between the counterparties periodically. Counterparty risk is also managed through posting of collateral; however, without the principal resets (and the associated cash flows) the posted collateral can accumulate significantly over the life of the swap.

6 Other cross-currency swaps can be deployed, such as those with fixed interest rate payments. These are effectively combinations of a cross-currency basis swap and single-currency interest rate swaps.

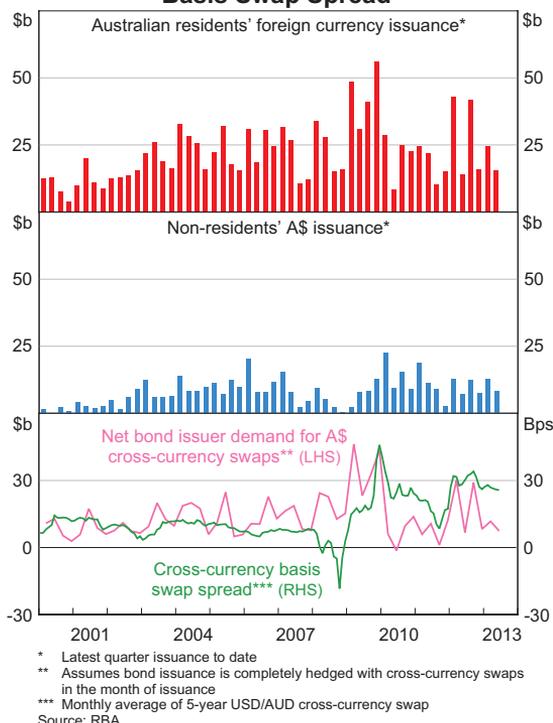
7 For a discussion on why Australian borrowers issue bonds in offshore markets, see Battellino (2002).

currency liabilities were hedged. Non-bank financial issuers, which, for the most part, are vehicles for asset-backed securities with Australian collateral, also employ a high degree of hedging to limit the FX risk associated with their foreign debt liabilities. This is because the foreign-currency denominated tranches of these asset-backed securities are typically fully hedged against FX risk to provide the investors with predictable cash flows. Non-financial corporations use derivatives for FX hedging to a lesser extent, with 60 per cent of their foreign currency liabilities hedged in 2009, because many of these issuers have a high proportion of foreign-currency denominated assets and revenue streams that they use as natural hedges.<sup>8</sup>

The other key users of Australian dollar cross-currency swaps are non-resident bond issuers that enter the market in the opposite direction of Australian residents – that is, they sell a foreign currency interest stream in order to buy an Australian dollar interest stream. These entities issue Australian dollar bonds both in the domestic market ('Kangaroo' bonds) and, to a much lesser extent, in offshore markets. They tend to be large and highly rated (typically AAA) sovereign-backed agencies and supranational institutions. While these entities have little requirement for Australian dollar funding, they issue in Australian dollars to diversify their investor base (aided by global investors' demand for Australian dollar exposure but without the associated credit risk of Australian entities). They also issue to take advantage of the revenue stream associated with the (typically) positive cross-currency basis swap (Graph 2). Non-resident issuers of Australian dollar bonds can receive this basis spread and raise funds at an attractive net cost by issuing a bond in Australia and entering into a cross-currency basis swap.

While Kangaroo issuers are a natural counterparty to Australian offshore foreign currency issuance and are active in the Australian dollar cross-currency swap market on the opposite side of Australian offshore

**Graph 2**  
**Bond Issuance and the Cross-currency Basis Swap Spread**



bond issuers, there are a number of other investors that gain long Australian dollar exposures through cross-currency swaps.

In general, cross-currency swaps are intermediated by a broad range of international banks. The latest available data indicate that around 90 per cent of the outstanding positions (based on notional amount) in cross-currency swaps of the main Australian banks, which are the largest Australian participants in the market, were with 20 large international banks with geographically diversified domiciles.<sup>9</sup> Around a half of the outstanding positions were with European and UK bank counterparties, and one third were with US banks. Australian banks also actively manage the credit risk associated with their positions through bilateral

8 See Becker and Fabbro (2006) for a discussion of hedging practices of Australian companies.

9 These data were collected by APRA as part of a survey conducted in November 2011 on the expected impact of the Basel III capital framework. The data cover the 40 largest OTC counterparties of each of the large Australian banks.

collateralisation under CSAs, although the extent to which exposures are covered by collateral varies.<sup>10</sup> Over 95 per cent of the cross-currency swaps (by notional amount) of the Australian banks were under contracts with CSAs. While large international banks may retain some of the risk associated with intermediating these cross-currency swaps, they pass nearly all of it on to foreign investors seeking Australian dollar exposure via derivatives markets or to Australian investors seeking to hedge their holdings of foreign currency assets.

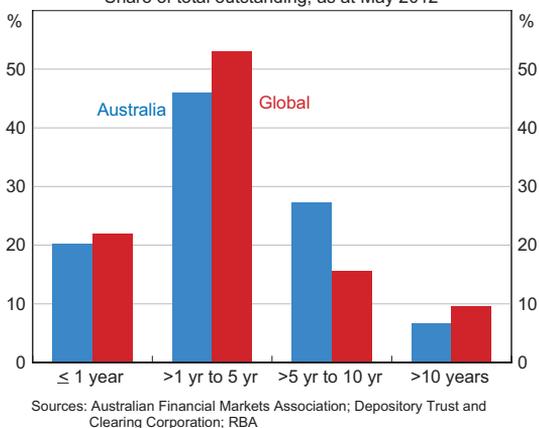
### Characteristics of the Cross-currency Swap Market in Australia

As at December 2012, the outstanding value of OTC derivatives in the Australian market was around US\$12 trillion, with FX derivatives accounting for 31 per cent of this.<sup>11</sup> This was well above the global average of 10 per cent, consistent with Australian entities' greater propensity to utilise offshore funding markets and to hedge the resulting FX rate risk.<sup>12</sup> The key FX derivatives used by Australian entities are FX swaps and forwards, and cross-currency swaps, which each make up 47 per cent of FX derivatives outstanding.<sup>13</sup> This is above the international average of 38 per cent for cross-currency swaps and around the global average for FX swaps and forwards. As it is globally, the cross-currency swaps market in Australia is largely an interbank market, with financial institutions acting as counterparties

for 90 to 95 per cent of the outstanding contracts by notional amount.

Australian entities tend to match the maturity of the hedging instrument and the foreign currency liability being hedged. Consistent with this, and given the maturity of foreign currency debt issuance, the residual maturities of cross-currency swaps outstanding are predominantly between one and five years. For cross-currency swaps entered into by Australian entities as at May 2012, around 17 per cent of maturities are less than one year, 53 per cent are between 1 to 5 years and 30 per cent are beyond 5 years. This is largely consistent with the maturity profile of these derivatives globally (Graph 3).

**Graph 3**  
**Cross-currency Swap Residual Maturities**  
 Share of total outstanding, as at May 2012



Almost all cross-currency swaps, both in Australia and globally, involve at least one of the US dollar, euro, Japanese yen or British pound, while the majority has the US dollar on one side (Graph 4). Globally, the Australian dollar is the fifth most frequently used currency in cross-currency swaps, and is involved in around 15 per cent of transactions (by notional amount); an Australian dollar leg is part of almost all transactions (by notional amount) in the Australian market.

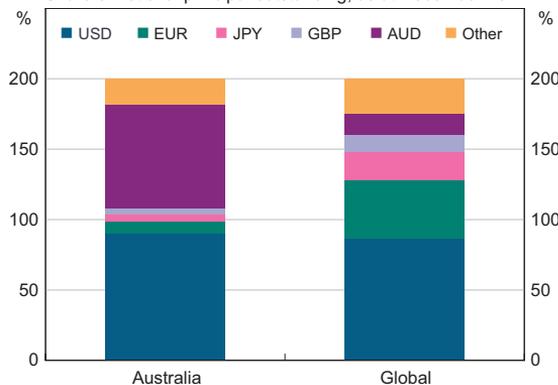
<sup>10</sup> Market reports indicate that most cross-currency swaps entered into by Australian banks are structured with principal reset. In addition to this built-in mechanism for mitigating counterparty risk, collateralisation under CSAs is used to cover exposures between the reset dates.

<sup>11</sup> BIS data on cross-currency swaps outstanding are reported on a global consolidated basis; that is, data for Australia include all branches and majority-owned subsidiaries of Australian-headquartered banks, but not Australian branches of banks with headquarters overseas. Data are also available on FX derivatives turnover; however, the notional amount of outstanding contracts provides a better measure of the importance of cross-currency swaps, which are generally longer-dated and less frequently traded than other FX derivatives such as FX swaps and FX forwards.

<sup>12</sup> See Ahn, Matic and Vallence (2012).

<sup>13</sup> Data collected via the BIS semiannual survey. The notional amounts for FX forwards are as at June 2012.

**Graph 4**  
**Cross-currency Swap Currency Breakdown\***  
 Share of notional principal outstanding, as at December 2012



\* Total share sums to 200 per cent as each swap involves two currencies  
 Sources: BIS, RBA

### Implications of OTC Derivatives Reforms

There are a number of relevant factors to consider when implementing the OTC derivatives reforms in the market for cross-currency swaps.

- While CCPs currently operate for a number of classes of OTC derivatives, such as single-currency interest rate swaps, credit default swaps and non-deliverable FX derivatives, central clearing solutions have not yet emerged in deliverable FX markets.<sup>14</sup> A key barrier to the development of these solutions has been the need to use an appropriate mechanism for managing the settlement risk associated with the exchange of payments in two currencies (Manning, Heath and Whitelaw 2010). Since its establishment a decade ago, CLS Bank (CLS) has become the standard for settlement of deliverable FX transactions. CLS offers a ‘payment-versus-payment’ settlement service that eliminates so-called Herstatt risk: the risk that one leg of an FX transaction settles while the other does not, exposing the party that has paid to a loss of principal. However, CLS’s gross,

<sup>14</sup> Deliverable FX derivatives involve the exchange of principal in two different currencies. Examples include FX forwards, FX swaps and cross-currency swaps. Non-deliverable FX derivatives are settled in cash in a nominated currency.

transaction-by-transaction settlement model could present challenges to CCPs’ established systems for managing exposures and settling obligations on a net basis.

- Aside from the settlement issue, many of the other preconditions for central clearing (IOSCO 2012), including the degree of standardisation in the market and the availability of reliable pricing data, would seem to be met for cross-currency swaps. According to LCH.Clearnet Limited (2011), however, consensus would need to be reached on factors such as the currency of collateralisation and the valuation model. While consideration of these issues remains at an early stage, some CCPs are currently examining whether a cost-effective central clearing solution can be developed.
- FX forwards and swaps are exempt from central clearing and margining requirements in the United States. Among other things, this is because of the problems of linking with current market settlement arrangements and the high volumes and often short tenors of transactions. In announcing the exemption, the US Treasury noted that ‘disruptions to [the market’s] operations could have serious negative economic consequences’ (US Treasury 2012). Following a similar rationale, the WGMR is considering exempting FX forwards and swaps from mandatory initial margin requirements. Cross-currency swaps, however, are not covered by the US Treasury’s exemption, and are unlikely to be exempt entirely from the WGMR principles.

With cross-currency swaps unlikely to migrate to central clearing in the short term, additional requirements for non-centrally cleared derivatives will apply. These include:

- *Higher capital charges for non-centrally cleared derivatives:* under the Basel III capital framework, banks are required to hold more capital against non-centrally cleared positions (including cross-currency swap positions) relative to both previous levels and requirements for centrally cleared derivatives. The framework also

introduces a credit valuation adjustment charge that capitalises the risk of loss resulting from the declining creditworthiness of a counterparty (as opposed to loss due to a counterparty's default). The Basel III capital framework for counterparty credit risk was implemented in Australia in January 2013, and therefore Australian banks are already subject to these higher requirements.

- *Margin requirements for non-centrally cleared derivatives:* under the WGMR's proposed margining principles and requirements in the United States and European Union, banks are likely to be required to post variation and initial margin against cross-currency swaps. Although the payment of variation margin is already common among Australian OTC derivatives market participants, the posting of initial margin is rare (APRA, ASIC and RBA 2012). The amount of initial margin to be posted under the WGMR principles is to be determined either with reference to a standardised schedule of margin rates, or by a quantitative model that will have received regulatory approval.

While these requirements would be expected to contribute to the reduction of systemic risk where cross-currency swaps remain non-centrally cleared, there may nevertheless be some benefits from the development of a central clearing solution for cross-currency swaps. First, exposures relating to cross-currency swaps cleared through a CCP that met relevant international standards would face lower prudential capital requirements.<sup>15</sup> Second, depending on the final form of the WGMR principles, a CCP could impose more finely calibrated and risk-sensitive initial margin requirements than those that would be determined under the principles. This might reflect a CCP's use of netting and cross-product offsets (possibly with other interest rate or foreign exchange derivatives), although the scope for netting cross-currency swap

exposures might be limited given that Australian banks typically take large 'one-way' positions in the Australian dollar versus other currencies to hedge their funding in those currencies.

A third and important benefit of a CCP would be the introduction of a centralised mechanism for managing the default of a participant in the market. In the absence of a CCP, in the event of a default, banks would have to hedge their exposures and replace their cross-currency swap positions with another counterparty. This would be likely to be difficult in a stressed market and, in the absence of a mechanism to coordinate the actions of counterparties to the participant in default, it could exacerbate disruption to the market. A CCP can typically handle the default of a counterparty in a more orderly manner via transparent, documented and enforceable procedures to close out or auction the defaulter's positions.

Irrespective of whether cross-currency swaps transition to central clearing or remain in a non-centrally cleared environment, requirements to post initial margin under the reforms are likely to increase the 'up-front' cost to Australian banks of using cross-currency swaps to hedge their overseas funding. In considering the implementation of the reforms in this market, therefore, it is important also to consider banks' incentives to continue to hedge their positions using cross-currency swaps. In particular, since FX forwards and swaps are likely to remain exempt from the reforms, there is a risk that banks may respond to an increased cost of using cross-currency swaps by engaging in less effective and more complex hedges, possibly involving a combination of FX swaps or forwards and single-currency interest rate swaps.

## Conclusion

Cross-currency swaps are commonly used by Australian banks and play an important role in Australian banks' offshore funding practices. Although many classes of OTC derivatives are migrating to CCPs under global regulatory reforms,

<sup>15</sup> Under Basel III, lower capital requirements are available only on exposures to 'qualifying' CCPs, defined as those that operate in jurisdictions that have implemented the *Principles for Financial Market Infrastructures* developed by the Committee on Payment and Settlement Systems and IOSCO (CPSS-IOSCO 2012).

the cross-currency swaps market is likely to remain non-centrally cleared for the near future since no central clearing solutions for this derivatives class have yet been developed. In the continued absence of an effective clearing solution for cross-currency swaps, there might be a case to examine whether certain aspects of a CCP's centralised default management could be replicated by the development of an enforceable mechanism through the collaboration of market participants, relevant trade associations (such as the International Swaps and Derivatives Association) and regulators. More generally, whether cross-currency swaps are centrally or non-centrally cleared, when implementing the reforms careful consideration needs to be given to the issue of how market participants will adjust to the new environment. ✕

## References

- Ahn J, M Matić and C Vallence (2012)**, 'Australian OTC Derivatives Markets: Insights from the BIS Semiannual Survey', *RBA Bulletin*, December, pp 39–45.
- APRA, ASIC and RBA (Australian Prudential Regulation Authority, Australian Securities and Investments Commission and Reserve Bank of Australia) (2012)**, 'Report on the Australian OTC Derivatives Market', October. Available at <<http://www.rba.gov.au/payments-system/clearing-settlement/otc-derivatives/201210-otc-der-mkt-rep-au/index.html>>.
- APRA, ASIC and RBA (2013)**, 'Australian Regulators' Statement on Assessing the Case for Mandatory Clearing Obligations', 8 May. Available at <<http://www.cfr.gov.au/publications/cfr-publications/australian-auth-statmnt-mandatory-clearing-obligations.html>>.
- Battellino R (2002)**, 'Why do so Many Australian Borrowers Issue Bonds Offshore?', *RBA Bulletin*, December, pp 19–24.
- Becker C and D Fabbro (2006)**, 'Limiting Foreign Exchange Exposure through Hedging: The Australian Experience', RBA Research Discussion Paper No 2006-09.
- CPSS-IOSCO (Committee on Payment and Settlement Systems and the Technical Committee of the International Organization of Securities Commissions) (2012)**, 'Principles for Financial Market Infrastructures', April. Available at <<http://www.bis.org/publ/cpss101.htm>>.
- D'Arcy P, M Shah Idil and T Davis (2009)**, 'Foreign Currency Exposure and Hedging in Australia', *RBA Bulletin*, December, pp 1–10.
- G20 (2009)**, Leaders' Statement from the Pittsburgh Summit, 24–25 September. Available at <<http://www.g20.org/load/780988012>>.
- G20 (2011)**, Leaders' Statement from the Cannes Summit, 3–4 November. Available at <<http://www.g20.org/load/780986747>>.
- IOSCO (International Organization of Securities Commissions) (2012)**, 'Requirements for Mandatory Clearing', February. Available at <<https://www.iosco.org/library/pubdocs/pdf/IOSCOPD374.pdf>>.
- LCH.Clearnet Limited (2011)**, 'Mandatory Clearing Analysis: OTC Interest Rate Derivatives', Submission to US Commodity Futures Trading Commission, 14 September. Available at <[http://www.cftc.gov/ucm/groups/public/aboutcftc/documents/file/reviewofswaps\\_lch2.pdf](http://www.cftc.gov/ucm/groups/public/aboutcftc/documents/file/reviewofswaps_lch2.pdf)>.
- Manning M, A Heath and J Whitelaw (2010)**, 'The Foreign Exchange Market and Central Counterparties', *RBA Bulletin*, March, pp 49–57.
- US Treasury (US Department of the Treasury) (2012)**, 'Fact Sheet: Final Determination on Foreign Exchange Swaps and Forwards', Press Release, 16 November.

