

2013/14 Assessment of LCH.Clearnet Limited's SwapClear Service

September 2014

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1. Introduction and Executive Summary

In accordance with its responsibilities under the *Corporations Act 2001*, the Reserve Bank (the Bank) carries out periodic assessments of how well each clearing and settlement (CS) facility licensee is complying with applicable Financial Stability Standards (FSS) determined by the Bank and the more general obligation to do all other things necessary to reduce systemic risk.¹ The Bank's findings are reported to the Minister with portfolio responsibility for Corporations Law, and are also notified to the Australian Securities and Investments Commission (ASIC) and published on the Bank's website.

LCH.Clearnet Limited (LCH.C Ltd) is incorporated in England and is primarily regulated by the Bank of England (BoE), under European Union (EU) and United Kingdom (UK) legislation. LCH.C Ltd offers central clearing for a range of products, of which it is licensed to offer a subset in Australia. In April 2013, LCH.C Ltd was granted an Australian CS facility licence permitting it to clear certain financial products traded on the Financial and Energy Exchange (FEX) market. This licence was varied in July 2013 to permit LCH.C Ltd to offer its SwapClear service. This report presents the Bank's Assessment of SwapClear for the year ending 30 June 2014, with a particular focus on its services to Australian participants. The FEX market is not yet operational.

The Bank conducted due diligence with reference to all of the applicable *Financial Stability Standards for Central Counterparties* (CCP Standards) prior to advising the Minister on LCH.C Ltd's application for a licence variation in 2013.² In 2013/14 the Bank assessed LCH.C Ltd's observance of all relevant requirements under the CCP Standards that had previously been subject to transitional relief. These came into effect in March 2014.

The 2013/14 Assessment period has been a time of transition for LCH.C Ltd, during which it has admitted its first Australian participants and begun to establish processes and arrangements to meet the needs of the Australian market. Accordingly, the Bank's Assessment in this period has been more narrowly focused than will be the case in future years. In particular, in addition to assessing LCH.C Ltd against the newly applicable CCP Standards, the Bank's Assessment has focused primarily on the tailoring of LCH.C Ltd's services to Australian participants. These developments have been considered in light of the initial regulatory priorities set by the Bank at the time of licensing. Consistent with the Bank's stated approach to assessing CS facility licensees, the Bank has not formally 'rated' the level of LCH.C Ltd's observance against the each of the sub-standards in the newly applicable CCP Standards.³

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- 1 Until June 2013, the Bank was obliged to carry out such assessments annually. A recent legislative amendment restricts the obligation to carry out annual assessments to CS facility licensees prescribed by regulation. No CS facility licensee has yet been prescribed for annual assessments. The Bank has nevertheless clarified in a policy statement that it is likely to carry out assessments of LCH.C Ltd on an annual basis; see 'Frequency of Regulatory Assessments of Licensed Clearing and Settlement Facilities', available at <<http://www.rba.gov.au/payments-system/policy-framework/frequency-of-assessments.html>>.
 - 2 See RBA (2013), *Assessment against the Financial Stability Standards for Central Counterparties of LCH.Clearnet Limited's SwapClear Service*, June. Available at <<http://www.rba.gov.au/payments-system/clearing-settlement/assessments/lch/>>.
 - 3 For domestic CS facility licensees, the Bank's assessment reports discuss how well the licensee has observed each high-level standard. However, except in the case of special topics, the Bank does not separately classify the level of a CS facility's observance of each sub-standard. See 'The Reserve Bank's Approach to Assessing Clearing and Settlement Facility Licensees', available at <<http://www.rba.gov.au/payments-system/clearing-settlement/standards/assess-csf-licensees.html>>.

The Bank has nevertheless described how LCH.C Ltd observes each sub-standard and has identified regulatory priorities, as appropriate.

In its future Assessments, the Bank will review LCH.C Ltd's observance of the requirements under all relevant CCP Standards. In contrast to its practice for domestically licensed CS facilities, the Bank will not present a formal rating of the level of LCH.C Ltd's observance of each high-level standard in the CCP Standards. A full evidence base for each applicable CCP Standard will nevertheless be reported. The absence of a formal rating reflects LCH.C Ltd's status as an 'overseas' CS facility licensee under section 824B(2) of the Corporations Act, and that in carrying out its oversight and Assessments the Bank places conditional reliance on reports and information from LCH.C Ltd's primary regulator, the BoE.⁴ Nevertheless, based on its Assessments, the Bank's practice will be to set regulatory priorities where it expects LCH.C Ltd to conduct additional work to enhance its observance of the requirements under particular CCP Standards.

1.1 Overview of Activity at LCH.Clearnet Limited

LCH.C Ltd's SwapClear service is the world's largest central counterparty (CCP) for over-the-counter (OTC) interest rate derivatives (IRDs), clearing just over US\$200 trillion, or around 91 per cent of the notional value outstanding of centrally cleared OTC IRDs. An estimated 98 per cent of the notional value outstanding of centrally cleared Australian dollar-denominated OTC IRD trades are cleared via SwapClear. Australian banks have previously been restricted to clearing their trades in SwapClear indirectly, as customers of other clearing participants. Since LCH.C Ltd's CS facility licence was varied in July 2013, however, three Australian banks have joined SwapClear as direct clearing participants and it is understood that other Australian banks plan to join in the future.

1.2 Assessment and Material Developments

As discussed above, the Bank's 2013/14 Assessment of LCH.C Ltd has focused primarily on LCH.C Ltd's progress against its initial regulatory priorities for SwapClear, set at the time LCH.C Ltd's licence was varied in July 2013. The Bank has also assessed LCH.C Ltd's observance of requirements under the CCP Standards that had previously been subject to transitional relief, and considered a number of additional material developments at LCH.C Ltd during the Assessment period.

1.2.1 Progress against 2013/14 regulatory priorities

In assessing LCH.C Ltd's application to vary its CS facility licence to offer its SwapClear service, the Bank took the view that the service could rapidly become systemically important in Australia. On the licence variation being granted in July 2013, the Bank determined an initial set of regulatory priorities for LCH.C Ltd to ensure that its operational and governance arrangements promoted stability in the Australian financial system. Specifically, the Bank expected LCH.C Ltd to:

- extend operating hours and operational support to the Australian time zone
- open an Exchange Settlement Account (ESA)
- consider accepting Australian dollar cash as initial margin

4 The Bank may place reliance on an overseas regulator in respect of FSS for which a 'materially equivalent' standard is applied in the overseas regulatory regime, and the Bank receives satisfactory documentary evidence from the overseas regulator that the licensee has complied in all material respects with those requirements. The Bank is yet to formally consider the material equivalence for the UK regime.

- ensure appropriate representation of Australian membership in governance
- ensure appropriate representation of Australian membership and regulators in default management

The Bank considers that with the formation of the Australian Member User Group (AMUG), LCH.C Ltd has met the recommendation that it should ensure Australian clearing participants are appropriately represented in governance arrangements. The Bank will continue to monitor the effectiveness of this arrangement. LCH.C Ltd is still progressing work to implement the remainder of the Bank's initial recommendations. The Bank expects LCH.C Ltd to finalise its work on these priorities during 2014/15.

1.2.2 CCP Standards previously subject to transitional relief

In 2013/14, the Bank assessed LCH.C Ltd's observance of all relevant requirements under the CCP Standards that had previously been subject to transitional relief. In its Assessment against these standards, the Bank identified one aspect of LCH.C Ltd's management of liquidity risk in which it recommended that LCH.C Ltd conduct additional work; this forms part of the Bank's 2014/15 regulatory priorities.

- *Recovery, wind-down and resolution.* In the first half of 2014, LCH.C Ltd introduced a Recovery Plan and a Wind-down Plan, which set out how it would continue, or cease, respectively, its operations if it suffered extreme losses. The Recovery Plan envisages that LCH.C Ltd would largely utilise existing rules and work practices in a recovery situation – including rules to allocate uncovered losses arising from a clearing participant default to clearing participants, up to a cap. LCH.C Ltd also introduced new rules in May 2014 to allocate to clearing participants investment-related losses caused by the default of an issuer of a debt instrument or an investment counterparty. LCH.C Ltd maintains liquid net assets funded by equity to implement its Recovery Plan and Wind-down Plan. It has funds set aside to cover risks including operational and legal risk, uncovered credit, counterparty credit and market risks, and business risks, as well as the implementation of its Wind-down Plan.

Since LCH.C Ltd is a UK-based CS facility, resolution would be expected to be led by the UK's resolution authority, the BoE. The Bank will continue to liaise with the BoE on this topic. In addition to this, as part of its resolution planning in the coming period, LCH.C Ltd may need to consider how relevant authorities could take effective crisis management actions to ensure that providers of outsourced critical services would be able to provide continuous reliable service in a crisis.

- *Liquidity risk management.* LCH.C Ltd has arrangements in place to ensure that it has access to sufficient liquid resources to meet its projected payment obligations on time in the event of default of the two clearing participants and their affiliates that would generate the largest aggregate payment obligations in extreme but plausible scenarios (i.e. its 'cover two' liquidity needs). LCH.C Ltd has access to a number of tools that it could use to meet unforeseen and potentially uncovered liquidity shortfalls; these are described in its internal liquidity management policies as well as in its Recovery Plan.

LCH.C Ltd projects its cover two liquidity needs through liquidity stress testing. During the Assessment period, LCH.C Ltd also implemented a reverse stress-testing framework to assess the adequacy of its liquid resources. The Bank expects LCH.C Ltd to use its reverse stress-testing framework to demonstrate how its approach to modelling variation margin outflows for the purposes of liquidity stress testing captures a sufficient range of extreme but plausible scenarios.

The Bank will also engage with LCH.C Ltd as it continues to refine its proposed arrangements to manage its Australian dollar liquidity risk, utilising its ESA (if approved).

- *Segregation and portability of customer positions and associated collateral.* During the Assessment period, LCH.C Ltd introduced new account structures in order to comply with EU regulations. EU regulations require CCPs to offer customers the option of both individual segregation and omnibus segregation. LCH.C Ltd also has rules and procedures to enable a participant's customer's positions and collateral to be ported to another clearing participant if its original clearing participants defaulted or was insolvent.

1.2.3 Material developments

In June 2014, LCH.C Ltd was authorised under, and became formally subject to, the harmonised European regulatory framework for CCPs, *Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories* (commonly known as EMIR). EMIR and its associated technical standards largely implement the principles within the Committee on Payment and Settlement System (CPSS)⁵ and International Organization of Securities Commissions (IOSCO) *Principles for Financial Market Infrastructures* (the Principles) in the EU. At the same time, LCH.C Ltd was also recognised by the BoE as a 'recognised central counterparty' under UK legislation. In advising the Minister regarding LCH.C Ltd's application for a variation to its CS facility licence, the Bank assessed that the stability-related requirements in the EU regulatory regime, alongside the additional UK requirements that were in place at the time, were sufficiently equivalent to the CCP Standards.

LCH.C Ltd made a number of material changes to its policies and practices to ensure its compliance with EMIR and to meet UK recognition requirements. Many of these changes enhance LCH.C Ltd's compliance with the CCP Standards. These, and other material developments relevant to LCH.C Ltd's SwapClear service, are discussed in Sections 3.6 and 3.7.

The remainder of this report is structured as follows. Section 2 summarises in tabular form the Bank's regulatory priorities with respect to its oversight of LCH.C Ltd. Section 3 draws out key developments over the Assessment period, including LCH.C Ltd's progress towards the Bank's regulatory priorities. Section 3 also describes LCH.C Ltd's regulatory and operating environment, as well as activity and risk management for the SwapClear service. The Appendix concludes with the Bank's detailed assessment of LCH.C Ltd's SwapClear service against the nine CCP sub-standards for which transitional relief expired during the Assessment period.

The Bank welcomes LCH.C Ltd's continued efforts towards ensuring its operations contribute to the stability of the Australian financial system and appreciates the cooperation of LCH.C Ltd staff and management during the preparation of this Assessment, and the open and constructive dialogue throughout the Assessment period.

The Bank has also engaged with the BoE throughout the same period, bilaterally and through the LCH.C Ltd Global College. The Bank looks forward to continuing the constructive dialogue.

5 CPSS has recently been renamed the Committee on Payments and Market Infrastructures.

2. Summary of Regulatory Priorities

LCH.C Ltd's CS facility licence was varied in July 2013 to permit it to offer its SwapClear service. Consequently, as noted in Section 1, 2013/14 has been a transition period for LCH.C Ltd, during which it admitted its first Australian participants and begun to establish processes and arrangements to meet the needs of the Australian market. The tailoring of LCH.C Ltd's services to Australian participants has been a focus of the Bank's oversight of LCH.C Ltd during the Assessment period.

In assessing LCH.C Ltd's application to vary its licence, the Bank took the view that the SwapClear service could rapidly become systemically important in Australia. On the licence variation being granted, the Bank determined a set of regulatory priorities for LCH.C Ltd to ensure that its operational and governance arrangements promoted stability in the Australian financial system. These priorities, and LCH.C Ltd's progress towards them, are summarised in Table 1 and discussed in more detail in Section 3. The Bank expects LCH.C Ltd to finalise its work on these priorities during 2014/15.

Table 1: LCH.C Ltd Regulatory Priorities for 2013/14

Standard	Recommendation	Comment
<i>Regulatory Priorities Specifically Related to LCH.C Ltd's Provision of Services to the Australian Market</i>		
6. Margin 16. Operational risk	The Bank expects LCH.C Ltd to extend operating hours and operational support to the Australian time zone.	Partly addressed. Expected to be fully addressed by end 2014. LCH.C Ltd implemented rule changes in May 2014 to allow trades registered early in the Australian morning to be cleared immediately if the SwapClear system is open. Subject to non-objection from the BoE, operating hours will be extended in stages. The first stage is scheduled to occur in the third quarter of 2014 and will reduce the amount of time the SwapClear service is closed from 7½ hours to 4 hours. LCH.C Ltd intends to have additional operational and management staff in Australia from the third quarter of 2014. Interim support arrangements are in place until that occurs.
9. Money settlements	LCH.C Ltd should open an ESA.	Partly addressed. Expected to be fully addressed by end 2014. LCH.C Ltd has submitted a preliminary application to the Bank to open an ESA and is engaging with the relevant areas of the Bank to finalise its application. Subject to LCH.C Ltd finalising its operational arrangements and the Bank approving the application, LCH.C Ltd intends for its ESA to be operational in the fourth quarter of 2014.
5. Collateral	LCH.C Ltd should consider accepting Australian dollar cash as initial margin.	Expected to be fully addressed in 2015. LCH.C Ltd is considering accepting Australian dollar cash as initial margin by early 2015, subject to formal internal governance and non-objection from the BoE.
2. Governance	LCH.C Ltd should ensure that Australian clearing participants are appropriately represented in governance arrangements.	Fully addressed. LCH.C Ltd formed the AMUG in March 2014.

Standard	Recommendation	Comment
12. Participant default rules and procedures	LCH.C Ltd should ensure that its crisis management arrangements take appropriate account of Australian stability interests.	<p>Partly addressed. Further progress expected in 2014; expected to be fully addressed in 2015.</p> <p>Australian clearing participants take part in SwapClear Fire Drills. These provide SwapClear and its clearing participants the opportunity to practise default management processes.</p> <p>The Bank will continue to engage with LCH.C Ltd to ensure that its crisis management arrangements take appropriate account of Australian stability interests.</p>

The Bank has also assessed LCH.C Ltd's observance of all relevant requirements under the CCP Standards that came into effect in March 2014. As discussed in Section 1, the Bank has not formally 'rated' the level of LCH.C Ltd's observance against the each of the sub-standards in the newly applicable CCP Standards. The Bank has nevertheless described how LCH.C Ltd observes each sub-standard and identified regulatory priorities, as appropriate. The Bank's regulatory priorities for LCH.C Ltd for 2014/15 are summarised in Table 2. The recommendations in the table are discussed in more detail in Section 3 and in Appendix A.

Table 2: LCH.C Ltd Regulatory Priorities for 2014/15

Standard	Recommendation	Comment
<i>Regulatory Priorities Specifically Related to LCH.C Ltd's Provision of Services to the Australian Market</i>		
6. Margin 16. Operational risk	The Bank expects LCH.C Ltd to continue its work to extend operating hours and operational support in the Australian time zone.	<p>LCH.C Ltd has set out a time line over which it expects to extend its operating hours, subject to non-objection from the BoE. The first phase, scheduled for early in the fourth quarter of 2014, will reduce the the amount of time the SwapClear service is closed from 7½ to 4 hours. A second phase, scheduled for late 2014, will further reduce the closure time to 2 hours, while a third and final phase, to reduce this to 30 minutes, is also under consideration.</p> <p>LCH.C Ltd intends to have additional operational and management staff in its Australian office from the third quarter of 2014.</p>
9. Money settlements	<p>LCH.C Ltd should finalise its application for an ESA.</p> <p>LCH.C Ltd should develop and implement arrangements for the settlement of Australian dollar obligations through its ESA.</p>	<p>LCH.C Ltd has submitted a preliminary application to the Bank to open an ESA and is engaging with the relevant areas of the Bank to complete its application.</p> <p>LCH.C Ltd is currently engaging with market participants regarding its Australian dollar settlement arrangements. The Bank will continue to engage with LCH.C Ltd as it finalises these arrangements.</p>
7. Liquidity risk	LCH.C Ltd should develop and implement arrangements to manage its Australian dollar liquidity risk, utilising its ESA.	LCH.C Ltd has indicated to the Bank that it intends to manage its Australian dollar liquidity risk by holding collateral eligible for repo with the Bank in an Austraclear account in its own name. The Bank expects LCH.C Ltd to ensure processes are in place so that it can demonstrate the adequacy of its Australian dollar liquid resources on an ongoing basis.
5. Collateral	LCH.C Ltd should consider accepting Australian dollar cash as initial margin.	LCH.C Ltd is considering accepting Australian dollar cash as initial margin in early 2015, subject to formal internal governance and BoE non-objection. Should this be adopted, the Bank will expect to engage with LCH.C Ltd regarding any required amendments to LCH.C Ltd's Australian dollar settlement or liquidity arrangements.
12. Participant default rules and procedures	LCH.C Ltd should ensure that its crisis management arrangements take appropriate account of Australian stability interests.	<p>The Bank will continue to work with LCH.C Ltd on this topic over the coming Assessment period.</p> <p>It is expected that crisis management discussions will be considered further with the BoE and other regulators over the coming months.</p>

Standard	Recommendation	Comment
<i>Other Regulatory Priorities</i>		
7. Liquidity risk	LCH.C Ltd should use its reverse stress-testing framework to demonstrate how its approach to modelling variation margin outflows for the purposes of liquidity stress testing captures a sufficient range of extreme but plausible scenarios.	<p>During 2013/14, LCH.C Ltd implemented a reverse stress-testing framework to assess the adequacy of its liquid resources to meet its obligations on the default of its two largest clearing participants and their affiliates. The Bank expects LCH.C Ltd to continue to enhance this framework.</p> <p>The Bank will engage further on this matter with both LCH.C Ltd and the BoE during 2014/15.</p>

3. Assessment of LCH.Clearnet Limited against the Financial Stability Standards

3.1 Introduction

A CCP acts as the buyer to every seller, and the seller to every buyer in a market. It does so by interposing itself as the legal counterparty to all purchases and sales via a process known as novation. These arrangements provide substantial benefits to participants in terms of counterparty credit risk management as well as greater opportunities for netting of obligations. At the same time, however, they result in a significant concentration of risk in the CCP. This risk can crystallise if a clearing participant defaults on its obligations to the CCP, since the CCP must continue to meet its obligations to all of the non-defaulting participants. Accordingly, in order to promote overall stability of the Australian financial system, it is critical that the CCP identifies and properly controls risks associated with the operation of the CCP and conducts its affairs in accordance with the CCP Standards. Primary responsibility for the design and operation of a CCP in accordance with the CCP Standards lies with a CS facility licensee's board and senior management.

LCH.C Ltd operates a number of clearing services from its London operations. LCH.C Ltd holds an Australian CS facility licence allowing it to:

- clear commodity, energy and environmental derivatives traded on the FEX market. The FEX market is not yet operational.
- offer its SwapClear service in Australia. SwapClear is a CCP for OTC IRDs.

LCH.C Ltd is required under the Corporations Act to comply with applicable FSS determined by the Bank and to do all other things necessary to reduce systemic risk. This report presents the Bank's Assessment of the SwapClear service for the year ending 30 June 2014. The Bank's Assessment in this period has focused on the tailoring of LCH.C Ltd's services to Australian participants and LCH.C Ltd's observance of the requirements under the CCP standards that had previously been subject to transitional relief.

3.2 Activity in SwapClear

3.2.1 Global activity in SwapClear

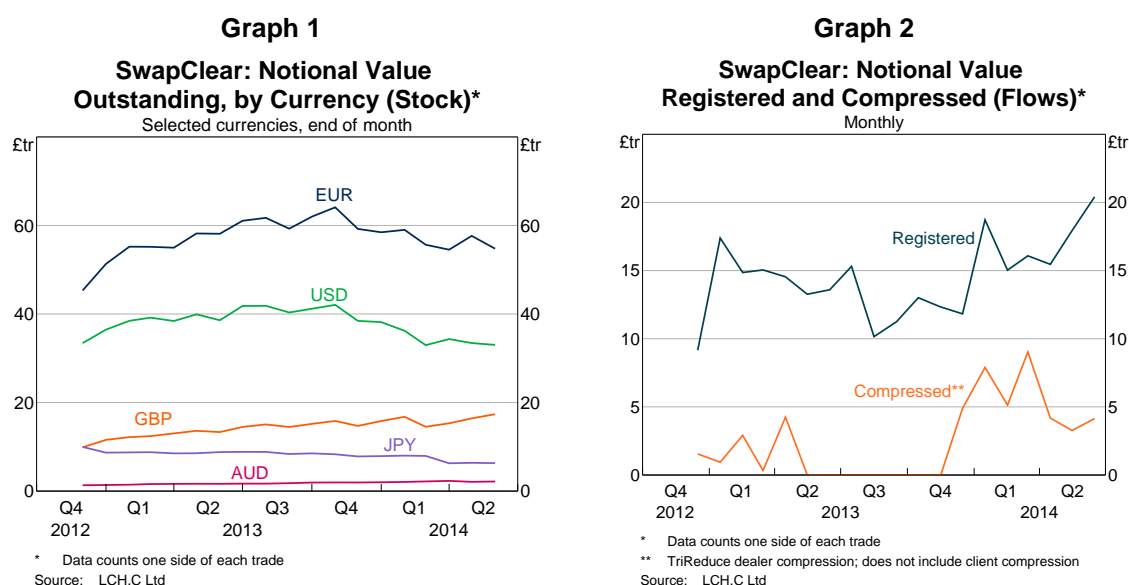
Globally, an estimated 65 per cent of the US\$354 trillion notional value outstanding of OTC IRDs is centrally cleared.⁶ LCH.C Ltd's SwapClear service is the world's largest CCP for these products, clearing just over US\$200 trillion, or around 91 per cent of the notional value outstanding of centrally cleared OTC IRDs. SwapClear clears a variety of OTC IRD types in 17 different currencies, and has participants

6 The data are sourced from the Bank for International Settlements as at the end of 2013, adjusted for the double counting that occurs when a trade is novated to a CCP. The gross market value of OTC IRDs was US\$14 trillion as at the end of 2013.

from the UK, many other Western European countries, the United States (US), Canada, Australia and Hong Kong.

A few major currencies comprise the vast majority of activity in SwapClear (Graph 1). Of the notional value outstanding in SwapClear at end June 2014, around 45 per cent was denominated in euros, 27 per cent in US dollars, 14 per cent in British pounds, and 14 per cent in other currencies. Around 2 per cent was in Australian dollars.

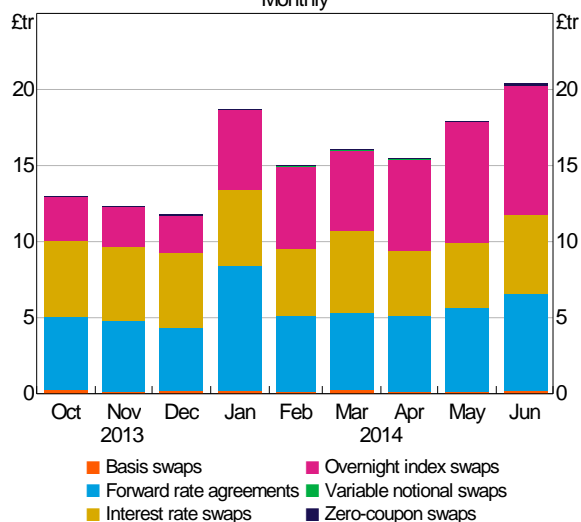
The recent decline in notional value outstanding, visible in Graph 1, largely reflects trade compression activity. Since LCH.C Ltd reintroduced ‘triReduce’ dealer trade compression in November 2013, clearing participants have had the ability to participate in periodic multilateral trade compression cycles conducted by compression vendor TriOptima. Compression is the practice of identifying offsetting trades in participants’ portfolios and terminating them, while leaving those participants’ market-facing exposures unchanged (within a stated tolerance). Termination reduces the operational overhead, and operational risk, of managing a large volume of redundant trades. It also simplifies default management processes, reducing the volume of trades that would need to be priced and auctioned in the event of a participant default. Since the reintroduction of dealer compression in November 2013, the notional value compressed each month has varied between £3 trillion and £9 trillion (Graph 2). Since November 2013, a total of £39 trillion of notional value has been compressed.⁷



SwapClear clears six types of IRD product: interest rate swaps, zero-coupon swaps, basis swaps, forward rate agreements, overnight index swaps and variable notional swaps. Graph 3 and Graph 4 depict notional value registered and notional value outstanding, respectively, by product type. Interest rate swaps constitute the largest component of the outstanding value of open trades. These products are a larger proportion of the stock than the flow because they have longer tenors than overnight index swaps and forward rate agreements.

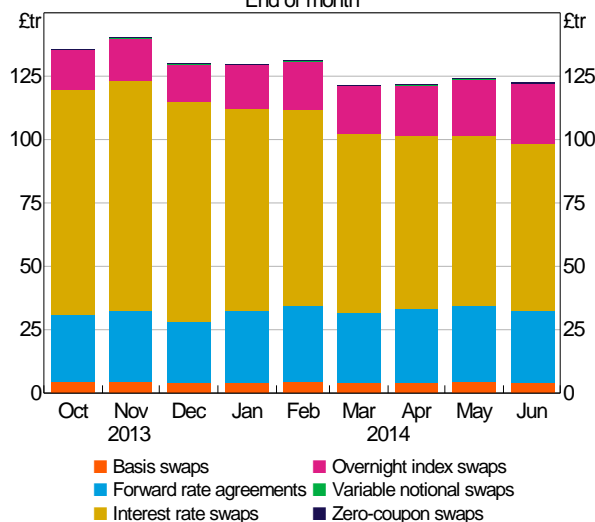
7 This figure counts one side of each centrally cleared trade. Counting both sides of each centrally cleared trade would result in a figure that is twice as large.

Graph 3
SwapClear: Notional Value of Trades Registered, by Type (Flow)*
 Monthly



* Data counts one side of each trade
 Source: LCH.C Ltd

Graph 4
SwapClear: Notional Value Outstanding, by Type (Stock)*
 End of month



* Data counts one side of each trade
 Source: LCH.C Ltd

3.2.2 Australian activity in SwapClear

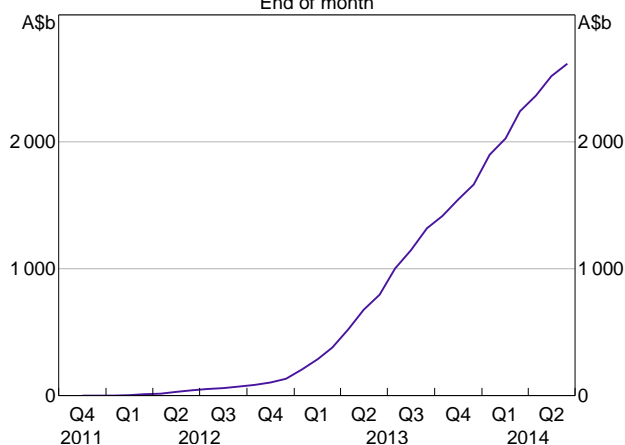
Since early 2012, the major Australian banks have centrally cleared a significant proportion of their OTC IRD trades indirectly, as customers of other clearing participants. In July 2013, the Minister varied LCH.C Ltd's CS facility licence to allow SwapClear to admit Australian entities as direct clearing participants. Since then, three Australian banks have joined SwapClear as clearing participants: ANZ joined in September 2013; National Australia Bank (NAB) joined in October 2013; and the Commonwealth Bank (CBA) joined in August 2014.

The total notional value outstanding of Australian banks, whether clearing as customers or as clearing participants, has increased strongly since late 2012 (Graph 5). According to a survey conducted by Australian regulators in early 2014, Australian dealers now centrally clear almost all new interdealer trades that are eligible for clearing.⁸ However, given that not all existing trades are eligible for clearing and that Australian entities have not yet 'backloaded' previously non-centrally cleared trades, only around 22 per cent of Australian entities' notional value outstanding of Australian dollar-denominated OTC IRDs is centrally cleared.

OTC IRDs comprise the majority of OTC derivatives activity in Australia. Single-currency OTC IRDs comprise about 65 per cent of the notional value and 45 per cent of the gross market value of Australian dealers' outstanding OTC derivatives. The majority of Australian dealers' OTC IRDs are interest rate swaps (Graph 6).

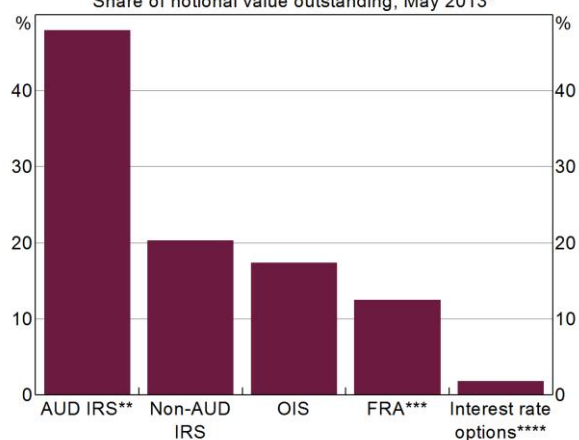
8 See CFR (2014), *Report on the Australian OTC Derivatives Market*, April. Available at <<http://www.cfr.gov.au/publications/cfr-publications/2014/report-on-the-australian-otc-derivatives-market-april/pdf/report.pdf>>.

Graph 5
SwapClear: Notional Value Outstanding of Australian Banks (Stock)*
 End of month



* Data is aggregate of Australian banks' trade sides; trades between two Australian banks will be counted twice
 Source: LCH.C Ltd

Graph 6
Australian OTC Interest Rate Derivatives Market
 Share of notional value outstanding, May 2013*



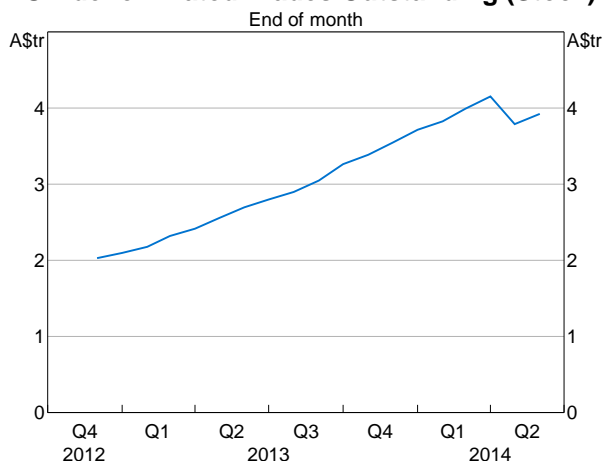
* Of all interest rate derivatives; excludes in-house transactions except for FRA
 ** Includes single- and cross-currency IRS with an AUD-denominated leg
 *** Includes AUD and non-AUD denominated FRAs
 **** Includes swaptions, bond options and caps/floors
 Source: AFMA

An estimated 98 per cent of the notional value outstanding of all centrally cleared Australian dollar-denominated OTC IRD trades are cleared via SwapClear. Australian banks' clearing activity has been part of a broader upward trend in notional value outstanding of Australian dollar-denominated OTC IRDs cleared via SwapClear. The total notional value outstanding of Australian dollar-denominated OTC IRDs cleared via SwapClear has doubled from A\$2 trillion in December 2012 to A\$4 trillion in June 2014 (Graph 7). However, in May 2014 the notional value outstanding of Australian dollar-denominated contracts fell due to a triReduce compression cycle for Australian dollar-denominated trades, which compressed around A\$535 billion.⁹ While the rate at which new Australian dollar-denominated trades are registered has been fairly stable over the past year (Graph 8), notional value outstanding has continued to increase in the long term because many contracts have long tenors.

9 The A\$535 billion figure counts one side of each centrally cleared trade. If both sides were counted, the figure would be A\$1.07 trillion.

Graph 7

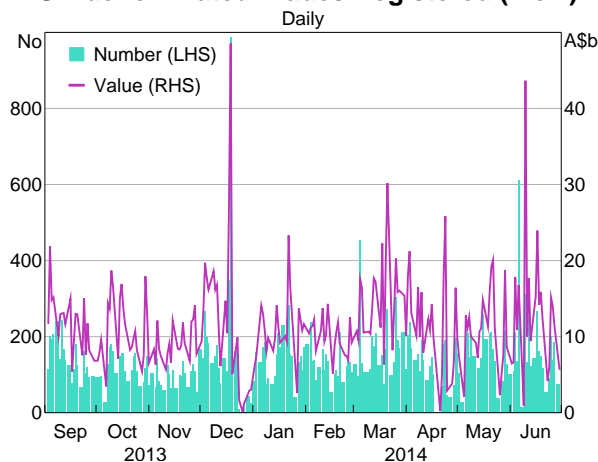
SwapClear: Notional Value of AUD-denominated Trades Outstanding (Stock)*



* Data counts one side of each trade
Source: LCH.C Ltd

Graph 8

SwapClear: Number and Notional Value of AUD-denominated Trades Registered (Flow)*



* Data counts one side of each trade
Source: LCH.C Ltd

3.3 Risk Management in SwapClear

A CCP is exposed to potential losses arising in the event of clearing participant default. LCH.C Ltd manages this risk in a number of ways, including participation requirements, margin collection, the maintenance of pooled resources and loss allocation arrangements.

3.3.1 Clearing participation requirements

To limit its exposure to its participants, LCH.C Ltd only allows institutions to become clearing participants if they meet certain financial and operational requirements. Prospective participants of SwapClear are required to have net capital of at least US\$50 million, appropriate banking arrangements, staff with sufficient experience, and appropriate systems to manage their clearing activities. Prospective participants must also demonstrate their operational capability to participate effectively in default management processes, including their ability to value and bid on the portfolio of a defaulting participant.

3.3.2 Margin collection

LCH.C Ltd covers its credit exposures to its SwapClear participants by collecting several types of margin.

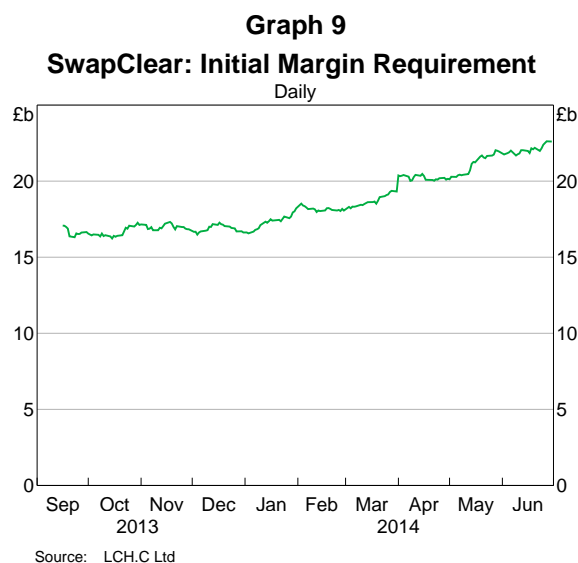
- *Variation margin.* All SwapClear positions are marked to market on at least a daily basis. Variation margin is collected from participants with loss-making positions and paid to those with profit-making positions. This practice ensures that LCH.C Ltd's valuations of SwapClear participant positions remain current and that uncovered losses do not accrue over time.
- *Initial margin.* LCH.C Ltd is exposed to risk arising from potential changes in the market value of a defaulting participant's open positions between the last settlement of variation margin and the close out of these positions. To mitigate this risk in normal market conditions, LCH.C Ltd will only

register trades if, at the point of registration, there are sufficient resources at the clearing participant level.

- *Intraday margin.* LCH.C Ltd monitors participants' portfolios intraday, to take account of changes in both prices and positions; LCH.C Ltd makes intraday margin calls where margin liabilities exceed predetermined participant-specific credit thresholds.
- *Additional margin.* LCH.C Ltd collects various forms of additional margin to cover any credit, liquidity, concentration and sovereign risks not captured by the base initial margin model. This includes, for example, daily or monthly 'default fund additional margin' (DFAM), which is called from participants with large exposures identified through stress testing (see Section 3.3.3).

LCH.C Ltd calculates initial margin requirements for SwapClear using its Portfolio Approach to Interest Rate Scenarios (PAIRS) model. The model sets initial margin requirements to cover potential losses over a 5-day close-out period with 99.7 per cent confidence, based on historical movements in yield curves and exchange rates over a 10-year look-back period. LCH.C Ltd assumes that an additional two-day period will be required to close out customer positions;¹⁰ initial margin requirements on the positions of customers of participants are scaled up accordingly.

Graph 9 shows the total initial margin requirement for all participants in SwapClear. LCH.C Ltd assesses the performance of its margin model through daily and monthly back-testing (described in Section 3.7.3); in addition, the adequacy of the model assumptions is assessed using monthly and quarterly sensitivity analysis (see Section 3.7.5).



3.3.3 Pooled financial resources

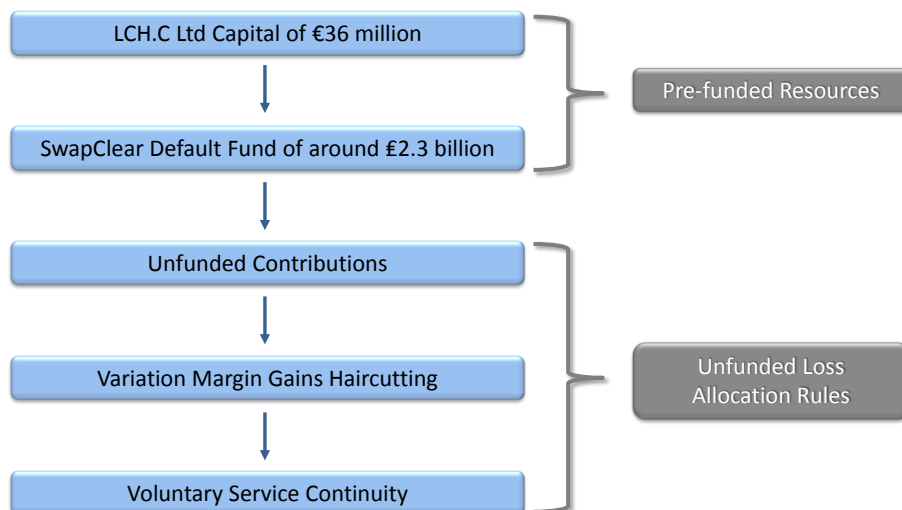
In the event of a counterparty default, any losses arising would first be covered by the margin and other collateral posted by the defaulter. Should this prove insufficient to meet LCH.C Ltd's obligations, it may draw on other resources in the SwapClear default waterfall.¹¹ This is depicted in Figure 1, which

¹⁰ The additional 2-day holding period for customer positions allows time for customers to decide whether to port their portfolio to another clearing participant, as well as time to carry out the port.

¹¹ LCH.C Ltd maintains a default waterfall for the SwapClear Global service, while LCH.C LLC maintains a default waterfall for the SwapClear US-based service. Each default waterfall has a separate default fund.

shows the order in which financial resources would be used to cover default losses in excess of the defaulter’s collateral, as at June 2014.

Figure 1
SwapClear Default Waterfall after the
Defaulter’s Collateral as at 30 June 2014



Source: LCH.C Ltd

Prefunded Resources

After using all the defaulter’s margin and other collateral (including the defaulter’s contribution to the SwapClear default fund), LCH.C Ltd would cover participant default losses using prefunded pooled resources.

All clearing participants of SwapClear are required to contribute to the SwapClear default fund. This is a pool of prefunded mutualised resources to which default losses could be allocated. The SwapClear default fund comprises two components: a core component (around £1 900 million at June 2014) and an additional component that supports the intraday provision of credit needed to facilitate ‘real time’ trade registration (£400 million as at June 2014). Both components are available to cover losses from participant defaults. LCH.C Ltd would use a slice of its own capital (€36 million as at June 2014) before the default fund contributions of non-defaulting participants, as required by EMIR.

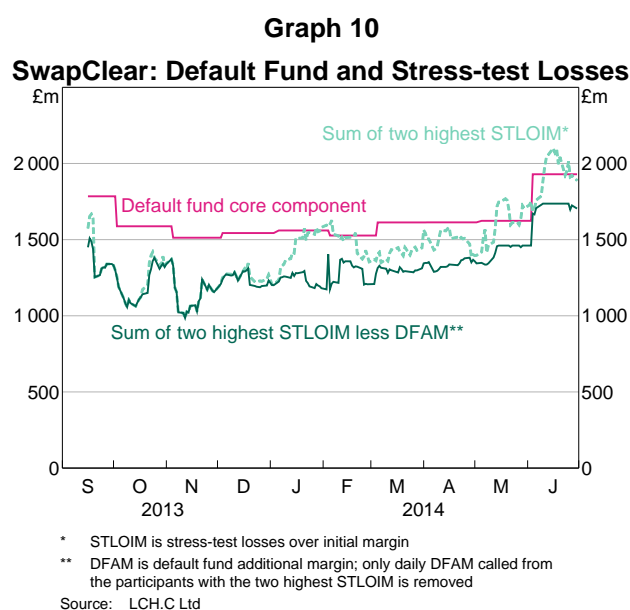
Default fund core component

The purpose of the core component is to cover any losses LCH.C Ltd would incur if the two clearing participants (including their affiliates and customers) with the largest exposures defaulted under extreme but plausible conditions, after using the defaulters’ initial margin and additional margin. This is intended to meet the cover two requirement under CCP Standard 4.4 and its equivalent under EMIR.

The core component is resized on the first business day of each month. As part of its process for sizing the core component, LCH.C Ltd may call monthly DFAM from a participant and its affiliates if they had

an 'outsized' stress-test loss over initial margin (STLOIM) in the previous 60 business days.¹² LCH.C Ltd holds monthly DFAM until the default fund is resized next month. Monthly DFAM is not mutualised; it can only be used to cover losses from the participant that posted it. The size of the core component of the default fund is then set to equal the two largest STLOIMs from the same scenario in the previous 60 business days, plus a buffer, less the amount of monthly DFAM called by LCH.C Ltd. LCH.C Ltd uses monthly DFAM to balance between 'defaulter pays' and mutualised resources, ensuring that participants with large exposures relative to the other SwapClear members sufficiently contribute to the resources required to cover those exposures.

Each day, LCH.C Ltd calls daily DFAM from participants and affiliates whose STLOIMs on that day exceed a predefined proportion of the default fund based on those participants' internal credit scores (ICS). The amount called is the difference between that STLOIM and the relevant proportion of the default fund on that day. Graph 10 demonstrates how the combination of default fund resizing based on scenario exposures and calling additional margin on concentrated risk positions through the daily DFAM mechanism ensures that, in aggregate, LCH.C Ltd maintains sufficient financial resources from a cover two perspective. Graph 10 shows: the default fund core component; the two highest STLOIM for the same scenario, net of daily DFAM (solid line), which is always lower than the default fund size; and the two highest STLOIMs for the same scenario, without adjusting for daily DFAM (dotted line).



The proportion of the core component that each SwapClear participant is obliged to contribute is calculated according to the average initial margin requirement on its house positions for the previous month as a share of SwapClear participants' total initial margin requirements. Contributions are subject to a minimum of £10 million per legal entity and are rebalanced each month.

Default Fund Real-time Trade Registration Component

To meet US regulatory requirements, SwapClear novates new trades every 60 seconds. Trades are novated provided that the incremental margin requirement arising from the trade is covered by collateral held by LCH.C Ltd, or is below a tolerance limit set by LCH.C Ltd. LCH.C Ltd assigns these tolerance limits to participants based on their ICSs. By extending credit to participants through

12 The STLOIM of a participant and its affiliates is based on the stress-test losses and initial margin of the participant, its affiliates, and all the customers of the participant and its affiliates.

tolerance limits, the frequency with which LCH.C Ltd can register trades is not restricted by the frequency with which LCH.C Ltd can collect margin.

LCH.C Ltd mitigates the credit risk that arises from offering trade registration tolerance limits through an additional component in the default fund. This additional component is currently sized at £400 million. The proportion that each participant is obliged to contribute is based on its tolerance limit utilisation relative to that of other participants over the prior 20 business days, subject to a floor of £3 million and a cap of £30 million. Participant contributions to the additional component are rebalanced on the same time line as those to the core component. Usage of this additional component is limited on a cover two basis, which means that no clearing participant may use more than £200 million of this component at any time.

Unfunded Loss Allocation Rules

If default losses exhausted the default fund, they would be allocated to participants through ‘loss allocation rules’, which are described in detail in Appendix A (CCP Standard 4).

- *Unfunded contributions.* LCH.C Ltd would call unfunded contributions from non-defaulting participants to the value of their last default fund contribution, once for each default, subject to maximum of three defaults in any six-month period.
- *Variation Margin Gains Haircutting.* LCH.C Ltd would apply haircuts to the variation margin payments owed to non-defaulting participants whose positions make gains, up to a cap.
- *Voluntary Service Continuity.* Should losses remain, LCH.C Ltd would ask non-defaulting participants to make voluntary contributions.

3.4 LCH.Clearent Limited’s Regulatory and Operating Environment

LCH.C Ltd is licensed in Australia under section 824B(2) of the Corporations Act, which provides an alternative licensing route for an overseas-based CS facility that is subject to requirements and supervision in its home country that are considered to be sufficiently equivalent to those in Australia. LCH.C Ltd is incorporated in England, and is primarily regulated under UK and EU legislation.

3.4.1 The regulatory regime

EU regulation

In July 2012, the EU introduced a harmonised framework for the regulation of financial market infrastructure (FMIs), including CCPs, incorporated in the region: EMIR.¹³ EMIR and its associated technical standards largely implement the Principles in the EU. Under EMIR, primary regulatory authority of a CCP is given to the national competent authority (NCA) in the country in which that CCP is established; since LCH.C Ltd is established in England, this is the BoE.

EMIR required CCPs incorporated in the EU to apply to their NCA for authorisation to continue offering clearing services. Authorisation is the point at which the CCP formally becomes subject to the requirements of EMIR. The BoE granted LCH.C Ltd authorisation under EMIR on 12 June 2014 (see Section 3.7 below).

¹³ As EMIR is an EU Regulation, implementing legislation is not required for it to be legally binding in each EU member state.

UK regulation

Within the UK, LCH.C Ltd is regulated by the BoE as a 'recognised central counterparty' under the UK *Financial Services and Markets Act 2000* (FSMA). FSMA sets recognition requirements for UK CCPs, which, among other things, require a CCP to:

- comply with EMIR and its technical standards
- develop a recovery plan, and adopt rules for the allocation of default losses and non-default losses that may threaten the CCP's solvency
- ensure under its rules that the positions or assets of customers of defaulting participants cannot be ported to a non-defaulting participant without the consent of the customer and the non-defaulting participant
- take measures to monitor and reduce financial crime and market abuse.

The BoE recognised LCH.C Ltd as a recognised central counterparty on the same date that it authorised LCH.C Ltd under EMIR. Prior to this date, LCH.C Ltd was regulated as a 'recognised clearing house' under FSMA. The recognition requirements for recognised clearing houses that are not EMIR-authorized CCPs are less detailed than the provisions in EMIR. Nevertheless, during the transition period prior to authorisation under EMIR, the BoE committed to be guided by EMIR and the Principles in its application of those recognition requirements to applicant CCPs. Further, the recognition requirements for recognised central counterparties concerning recovery and allocation of default losses, and allocation of non-default losses, became effective in February and May 2014, respectively.

In addition, the Protected Payments System (PPS) operated by LCH.C Ltd (the system that provides for settlement of margins and other payments between LCH.C Ltd and its clearing participants) is regulated and overseen by the BoE as a 'recognised payment system' under the UK's *Banking Act 2009*. The BoE requires LCH.C Ltd to operate this system having regard to the Principles.

Regulation in other jurisdictions

LCH.C Ltd's operations span several jurisdictions. Outside the EU, LCH.C Ltd has been formally licensed or granted an exemption in the US, Norway, Switzerland, Japan, the Canadian provinces of Ontario and Quebec, and Singapore, allowing it to offer a range of clearing services in those jurisdictions.

3.4.2 The EMIR College and the LCH.C Ltd Global College

EMIR establishes a framework for cooperative oversight of CCPs among EU authorities, requiring that a supervisory college be established for each EU-based CCP. EMIR specifies that membership of the college for each CCP be drawn from the EU authorities responsible for supervising: the CCP itself; clearing participants of the CCP; trading venues served by the CCP; central securities depositories to which the CCP is linked; and other interoperating CCPs. Membership should also include the central banks of issue of the most relevant EU currencies of the instruments cleared by the CCP.

The EMIR supervisory college for LCH.C Ltd is chaired by the BoE. The college was part of the decision-making process to authorise LCH.C Ltd under EMIR. The EMIR supervisory college will play a role in the ongoing supervision of LCH.C Ltd; it will be part of the decision-making process should LCH.C Ltd apply to the BoE to expand its services. The college will also facilitate the exchange of information among its members.

The BoE has also established a Global College for LCH.C Ltd's SwapClear service, membership of which extends beyond the EMIR supervisory college. The Bank is represented on the Global College. The

College facilitates the exchange of information and discussion of supervisory matters concerning LCH.C Ltd's SwapClear service, including through in-person meetings and regular exchanges of data. The BoE will review the organisation, scope and membership of the Global College during the second half of 2014.

3.4.3 The Bank of England's oversight approach and supervisory priorities

The BoE has a mandate to protect and enhance the stability of the UK financial system. In a published statement on its approach to oversight of FMIs,¹⁴ the BoE states that its role as supervisor is to ensure that FMIs for which it has oversight responsibility are 'managed consistently with the public interest, maintaining and enhancing financial stability and reducing systemic risk'. The BoE takes a risk-based approach to oversight, prioritising its supervisory effort in areas where it considers risks to financial stability are greatest.

The BoE conducts at least an annual assessment of the risks each UK FMI presents to financial stability. Based on its assessment, the BoE sets expectations of risk-mitigating actions the FMI should take, in the form of supervisory priorities. The BoE provides LCH.C Ltd with a single set of supervisory priorities, covering its operations as a CCP and as a payments system.

In March 2014, the BoE published a report on its oversight of UK FMIs.¹⁵ The report summarises the BoE's supervisory priorities during the period from March 2013 to March 2014, as they apply across all FMIs. These priorities, focusing on their relevance to the UK CCPs, were:

- *Credit and liquidity risk.* This included CCP margin and default fund methodologies, and monitoring of liquidity risk.
- *Recovery and resolution.* During the year to March 2014, the BoE required all FMIs to begin work to ensure they are able to manage unexpected financial losses. As discussed above, all UK CCPs were required, by February 2014, to have in place a recovery plan and rules to allocate clearing participant default losses in excess of prefunded resources.
- *Operational risk.* A key focus of the BoE's work on FMI operational resilience has been management of cyber risk. This work, conducted in conjunction with other UK authorities, will continue into 2014.
- *Governance.* The BoE noted that LCH.C Ltd had appointed two independent directors during the period, who will not serve as directors in any other LCH.Clearnet Group (LCH.C Group) company.
- *Disclosure.* The BoE stated that all FMIs made progress towards meeting the CPSS-IOSCO disclosure requirements.

The report also summarised the BoE's broad supervisory priorities for the 2014/15 period:

- *Credit and liquidity risk.* CCP stress-testing practices will be a particular focus of the BoE's oversight during this Assessment period.

14 BoE (2013), 'The Bank of England's approach to the supervision of financial market infrastructures'. Available at <<http://www.bankofengland.co.uk/financialstability/Documents/fmi/fmisupervision.pdf>>

15 BoE (2014), *The Bank of England's Supervision of Financial Market Infrastructures — Annual Report*. Available at <<http://www.bankofengland.co.uk/publications/Documents/fmi/fmiap1403.pdf>>. The report, which will be issued annually, is the first since the BoE became responsible for the supervision of securities settlement systems and CCPs in April 2013. It replaces the BoE's annual 'Payment Systems Oversight Report'.

- *Recovery and resolution.* UK legislation required that by 1 May 2014 all CCPs have rules or other effective arrangements to allocate non-default losses that threatened the solvency of the CCP. The BoE also noted that further work would be required to refine CCPs' recovery plans. In addition, the UK is working to implement a special resolution regime, which would cover CCPs. Legislation required to implement this was submitted to the UK Parliament in June 2014.
- *Operational risk.* The BoE will continue its program to increase the resilience of FMI's against cyber attack, as well as addressing operational risk management more broadly.

The BoE noted that its priorities were subject to review, should new issues or risks emerge.

3.5 Progress against the Bank's 2013/14 Regulatory Priorities

In assessing LCH.C Ltd's application to vary its CS facility licence to offer its SwapClear service, the Bank took the view that the service could rapidly become systemically important in Australia. On the licence variation being granted in July 2013, the Bank determined a set of regulatory priorities for LCH.C Ltd to ensure that its operational and governance arrangements promoted stability in the Australian financial system. These priorities reflect the expectations set by the Council of Financial Regulators (CFR) in July 2012 in its policy 'Ensuring Appropriate Influence for Australian Regulators over Cross-border Clearing and Settlement Facilities' (CFR Regulatory Influence Policy).¹⁶ These expectations are reflected in the FSS. The Bank's initial regulatory priorities for LCH.C Ltd were:

- to extend operating hours and operational support to the Australian time zone
- to open an ESA
- to consider accepting Australian dollar cash as initial margin
- appropriate representation of Australian membership in governance
- appropriate representation of Australian membership and regulators in default management.

LCH.C Ltd agreed to work with the Bank to address these priorities within a reasonable time frame. LCH.C Ltd's progress against these priorities during the 2013/14 Assessment period is summarised in Table 3 and described in more detail below. The Bank will continue to engage with LCH.C Ltd on a number of these regulatory priorities throughout the 2014/15 Assessment period.

¹⁶ The CFR Regulatory Influence Policy is available at <<http://www.treasury.gov.au/ConsultationsandReviews/Consultations/2012/cross-border-clearing>>.

Table 3: LCH.C Ltd Regulatory Priorities for 2013/14

Standard	Recommendation	Comment
<i>Regulatory Priorities Specifically Related to LCH.C Ltd's Provision of Services to the Australian Market</i>		
6. Margin 16. Operational risk	The Bank expects LCH.C Ltd to extend operating hours and operational support to the Australian time zone.	<p>Partly addressed. Expected to be fully addressed by end 2014.</p> <p>LCH.C Ltd implemented rule changes in May 2014 to allow trades registered early in the Australian morning to be cleared immediately if the SwapClear system is open.</p> <p>Subject to non-objection from the BoE, operating hours will be extended in stages. The first stage is scheduled to occur in the third quarter of 2014 and will reduce the amount of time the SwapClear service is closed from 7½ hours to 4 hours.</p> <p>LCH.C Ltd intends to have additional operational and management staff in Australia from the third quarter of 2014. Interim support arrangements are in place until that occurs.</p>
9. Money settlements	LCH.C Ltd should open an ESA.	<p>Partly addressed. Expected to be fully addressed by end 2014.</p> <p>LCH.C Ltd has submitted a preliminary application to the Bank to open an ESA and is engaging with the relevant areas of the Bank to finalise its application.</p> <p>Subject to LCH.C Ltd finalising its operational arrangements and the Bank approving the application, LCH.C Ltd intends for its ESA to be operational in the fourth quarter of 2014.</p>
5. Collateral	LCH.C Ltd should consider accepting Australian dollar cash as initial margin.	<p>Expected to be fully addressed in 2015.</p> <p>LCH.C Ltd is considering accepting Australian dollar cash as initial margin by early 2015, subject to formal internal governance and non-objection from the BoE.</p>
2. Governance	LCH.C Ltd should ensure that Australian clearing participants are appropriately represented in governance arrangements.	<p>Fully addressed.</p> <p>LCH.C Ltd formed the AMUG in March 2014.</p>
12. Participant default rules and procedures	LCH.C Ltd should ensure that its crisis management arrangements take appropriate account of Australian stability interests.	<p>Partly addressed. Further progress expected in 2014; expected to be fully addressed in 2015.</p> <p>Australian clearing participants take part in SwapClear Fire Drills. These provide SwapClear and its clearing participants the opportunity to practise default management processes.</p> <p>The Bank will continue to engage with LCH.C Ltd to ensure that its crisis management arrangements take appropriate account of Australian stability interests.</p>

LCH.C Ltd's progress towards the first three regulatory priorities was contingent on LCH.C Group's continued implementation of a new liquidity and collateral management system. Phase II of the system's implementation was completed in May 2014 when LCH.C Ltd's collateral management was transferred from the legacy system to the new system; an earlier stage of the system's implementation (Phase I) transferred LCH.C Ltd's cash and liquidity management. The new collateral management platform now supports the cover distribution process (which is the process in which lodged collateral is allocated to cover margin requirements), PPS calls and Society for Worldwide Interbank Financial Telecommunication (SWIFT) messaging, the management of non-cash collateral, and internal and external messaging and reporting for LCH.C Ltd. The project is now completed and has created a common collateral and liquidity management platform across LCH.C Ltd and LCH.Clearnet LLC (LCH.C LLC).

3.5.1 Extend operating hours and operational support to the Australian time zone

The Bank expects LCH.C Ltd to extend its operating hours and to provide appropriate support to participants in the Australian time zone. The operating hours of the SwapClear service (currently from 07:30 to 00:00 UK time) are such that operational support and payment arrangements are unavailable during much of the Australian business day, and trades executed during the Australian business day when the SwapClear service is closed are not novated to LCH.C Ltd until the Australian evening when the SwapClear service reopens. This leaves Australian banks and their counterparties with temporary bilateral credit risk exposures, which have to be managed via bilateral compensation arrangements and result in greater operational complexity and uncertainty.

The Bank's expectation that LCH.C Ltd should have the operational capability to novate trades and collect margin during the Australian business day is reflected in CCP Standard 6.8, which requires that a CCP 'consider the operating hours of payment and settlement systems in the markets in which it operates' in designing its margin system, and CCP Standard 16.5, which requires that '[w]here a central counterparty operates in multiple jurisdictions, managing [operational] risks may require it to provide adequate operational support to participants during the market hours of each relevant jurisdiction'.

LCH.C Ltd intends to increase SwapClear's operating hours in a number of phases, beginning later in 2014.

- The first phase will decrease the amount of time the SwapClear service is closed from 7½ hours to 4 hours – when this takes effect, SwapClear will be open from 04:00 to 00:00 UK time (13:00 to 09:00 Sydney time in winter; 15:00 to 11:00 Sydney time in summer). LCH.C Ltd plans to launch this phase in the third quarter of 2014.
- The second phase will decrease the amount of time the SwapClear service is closed from 4 hours to 2 hours, with SwapClear open from 02:00 to 00:00 UK time (11:00 to 09:00 Sydney time in winter; 13:00 to 11:00 Sydney time in summer). LCH.C Ltd currently plans to launch this phase late in the fourth quarter of 2014.
- A third and final phase, to reduce the time the service is closed to 30 minutes, is also under consideration.

A number of system changes will also be required to facilitate these changes. The extension of LCH.C Ltd's operating hours is also subject to non-objection from LCH.C Ltd's home regulator, the BoE.

Ahead of those changes, SwapClear implemented operational changes in May 2014 so that trades registered in the early morning in Australia are eligible to be cleared immediately if the SwapClear system is open. Before the changes were in place, trades entered in the early hours of the Australian day were held in a queue and processed the next business day, even if the SwapClear system was operating. For example, trades registered for clearing early on Tuesday morning in Sydney were held in a queue until SwapClear opened in London on Tuesday – even if the SwapClear system had been operating (on Monday evening London time) when the trades were registered. Now that the rule changes are in place, such trades are eligible to be cleared immediately if the SwapClear service is open. Using the earlier example, a trade registered for clearing on early Tuesday morning in Sydney will be eligible to be cleared immediately if SwapClear is still open, and if that occurs will be reported as being cleared on the Monday.

In setting this regulatory priority, the Bank acknowledged that LCH.C Ltd was already undertaking an upgrade of its banking and collateral management systems to facilitate novation of trades and the collection of margin over an extended operating day. However, the Bank noted that these changes were not due to take effect until the first half of 2014 and that operational support arrangements for Australian-based participants must be adequate in the interim. At present, Australian participants can seek operational support from LCH.C Ltd's current Sydney-based staff or via LCH.C Ltd staff in London or New York, although there is a gap in the middle of the Sydney day when support from the London or New York offices is unavailable. To support its extended hours of operation, LCH.C Ltd intends to have additional operational and management staff in its Australian office from the third quarter of 2014, bringing the total to around 10.

Recommendation. The Bank expects LCH.C Ltd to continue its work to extend operating hours and operational support in the Australian time zone.

3.5.2 Open an Exchange Settlement Account

The Bank requires LCH.C Ltd to open an ESA if it becomes systemically important in Australia and to use its ESA to settle its Australian dollar obligations. This is in accordance with the CFR Regulatory Influence Policy and CCP Standard 9.1. In the first instance, LCH.C Ltd intends to settle Australian dollar variation margin through its ESA. LCH.C Ltd is also considering accepting Australian dollar cash as initial margin (see below); settlement of this would be implemented in a second phase. Similarly, as required by CCP Standard 7.7, the Bank expects LCH.C Ltd to use its ESA to enhance its management of its Australian dollar liquidity risk.

LCH.C Ltd has submitted an application to the Bank to open an ESA and is currently engaging with the relevant sections of the Bank. Subject to the Bank approving LCH.C Ltd's application, LCH.C Ltd is aiming to have its ESA operational by the end of the fourth quarter 2014. Several interim steps must be completed ahead of this, including the completion of LCH.C Ltd's application to join the Australian Payments Clearing Association's High Value Clearing System and testing of the arrangements. As a requirement of holding an ESA, LCH.C Ltd will also need sufficient management resources located in Australia, with the ability to make timely decisions to operate the account (see Section 3.5.1 above on LCH.C Ltd's staff in Australia).

LCH.C Ltd has also applied to open an account with Austraclear to hold Australian dollar securities collateral. LCH.C Ltd expects its Austraclear account to be open in the fourth quarter of 2014. LCH.C Ltd intends to hold collateral eligible for repo with the Bank in its Austraclear account to facilitate management of its Australian dollar liquidity needs. LCH.C Ltd intends to hold sufficient eligible collateral to manage its potential Australian dollar liquidity needs in the event of the default of the two clearing participants with the largest projected Australian dollar obligations (see CCP Standard 7 in Appendix A).

To facilitate payments to and from its clearing participants, LCH.C Ltd operates a payment system known as the PPS. LCH.C Ltd is working to establish Australian dollar PPS arrangements through its ESA, and is currently in discussions with potential Australian dollar 'PPS banks' (i.e. the banks that will facilitate flows of clearing participants' Australian dollar settlement obligations to and from LCH.C Ltd's ESA). Although arrangements are not yet finalised, it is expected that they will largely mirror LCH.C Ltd's existing settlement arrangements. Nonetheless, the Bank expects any clearing participant that has joined the SwapClear service as a direct clearing participant since LCH.C Ltd had its CS licence varied to allow it to offer that service in Australia, and that also has an active ESA, to

become a PPS bank and to use those PPS arrangements to settle its Australian dollar obligations using its ESA (i.e. to 'self-PPS'). LCH.C Ltd expects its Australian PPS arrangements to be in place in the first quarter of 2015. The Bank expects to continue to engage with LCH.C Ltd regarding its Australian dollar PPS arrangements, including regarding potential concentration risks in these arrangements. The Bank will also engage with LCH.C Ltd regarding its arrangements for managing its Australian dollar liquidity needs.

Recommendations. LCH.C Ltd should finalise its application for an ESA.

LCH.C Ltd should develop and implement arrangements for the settlement of Australian dollar obligations through its ESA.

LCH.C Ltd should develop and implement arrangements to manage its Australian dollar liquidity risk, utilising its ESA.

3.5.3 Consider accepting Australian dollars as initial margin

The Bank expects LCH.C Ltd to review its collateral acceptance policy and consider the inclusion of Australian dollar cash for initial margin payments. This would 'support effective access by accommodating local market practices' as contemplated by the CFR Regulatory Influence Policy, and also contribute to LCH.C Ltd's compliance with CCP Standard 5.2. This requires that a CCP 'consider allowing the use of collateral commonly accepted in the relevant jurisdictions in which it operates'.

LCH.C Ltd is considering accepting Australian dollar cash as initial margin in early 2015. This proposal will still need to be formally approved through LCH.C Ltd's internal risk governance processes and is subject to non-objection from the BoE.

Recommendation. LCH.C Ltd should consider accepting Australian dollar cash as initial margin.

3.5.4 Appropriate representation of Australian membership in governance

The Bank expects LCH.C Ltd to establish appropriate governance mechanisms to reflect the views of Australian-based participants. This is consistent with CCP Standard 2.8, which requires that '[g]overnance arrangements [should] provide for consultation and stakeholder engagement through appropriate forums on operational arrangements, risk controls and default management rules and procedures'.

LCH.C Ltd liaises with Australian participants in a number of ways. It formed the AMUG for Australian direct participants in March 2014. The AMUG provides a means for LCH.C Ltd to seek input from Australian participants on proposed changes to policy and risk management procedures and to provide timely updates on material changes. It also provides an opportunity for Australian participants to propose to LCH.C Ltd policy changes that should be developed or prioritised at internal SwapClear governance forums. The AMUG is scheduled to hold face-to-face meetings quarterly and conference calls monthly. Membership of the AMUG is currently restricted to Australian direct clearing participants (and to entities that will be joining the SwapClear service imminently as Australian direct participants), although LCH.C Ltd is considering inviting Australian subsidiaries of overseas-based SwapClear participants. The Bank will monitor the effectiveness of these arrangements over the coming Assessment period.

Before the AMUG was established, Australian participants had the opportunity to take part in LCH.C Ltd's SwapClear International Advisory Meetings, which are convened three times a year to discuss specific policy changes with participants. These meetings are open to all participants but focus on serving participants without a dedicated regional user group (such as the AMUG). In addition, LCH.C Ltd convenes a 'SwapClear Programme Update' to disseminate information related to operations testing and development changes to clearing participants every two weeks.

As discussed above, LCH.C Ltd is also liaising with prospective PPS banks in Australia. An informal technical workshop was recently held for the prospective Australian PPS banks. When the PPS arrangements are established, LCH.C Ltd expects that it will convene meetings for the Australian dollar PPS banks three or four times a year to discuss technical, policy and risk management issues.

3.5.5 Appropriate representation of Australian membership and regulators in default management

The Bank expects LCH.C Ltd's crisis management arrangements to take appropriate account of Australian stability interests in the event that Australian-based direct participation in the SwapClear service becomes material. This is likely to imply some role for both the Bank and Australian-based participants in default management arrangements. Accordingly, the Bank will seek to enter into dialogue with LCH.C Ltd to discuss in detail how it is envisaged that the default of an Australian-based participant, or any participant with a large Australian dollar-denominated portfolio, would be managed. It is expected that such dialogue will clarify the roles of the Bank and Australian-based participants in this process. Meeting the Bank's expectations in this area would enhance LCH.C Ltd's compliance with CCP Standard 12.5, which requires that '[a] central counterparty should demonstrate that its default management procedures take appropriate account of interests in relevant jurisdictions and, in particular, any implications for pricing, liquidity and stability in relevant financial markets'.

One aspect of this is the involvement of Australian participants in SwapClear Fire Drills, which provides SwapClear and its participants the opportunity to practise aspects of its default management processes. In those tests, auction packs (i.e. hypothetical portfolios) are generated by SwapClear and participants are required to import and reconcile trade files and reports, value the auction packs and bid for each auction pack. ANZ and NAB took part in two Fire Drills during the Assessment period, in November 2013 and May 2014. In addition, before joining the SwapClear service prospective participants are required to take part in 'driving tests', which are tests undertaken outside the main Fire Drill to demonstrate their ability to value portfolios and bid for them. ANZ and NAB conducted tests in US dollars before they joined in 2013 and participated in other currencies as a driving test during the November 2013 Fire Drill, and CBA conducted a similar driving test before it joined in 2014.

The Bank will continue to work with LCH.C Ltd to ensure that its default management arrangements take appropriate account of Australian stability interests. The Bank will also consider the implications that a broader crisis within LCH.C Ltd, triggering (for example) recovery, wind-down or actions to resolve LCH.C Ltd, might have for financial stability within Australia. In the event of a crisis affecting LCH.C Ltd, the BoE would be the lead regulatory authority, in its capacity as LCH.C Ltd's primary regulator and also as the UK resolution authority. The Bank will continue to liaise with the BoE on this topic. The crisis management arrangements that would apply to LCH.C Ltd have important implications for all jurisdictions in which LCH.C Ltd operates, including for Australia, and it is expected that discussions with the BoE and other regulators to further consider LCH.C Ltd's crisis management arrangements will begin over the coming months.

Recommendation. LCH.C Ltd should ensure that its crisis management arrangements take appropriate account of Australian stability interests.

3.6 CCP Standards Previously Subject to Transitional Relief

In December 2012, the Bank determined new FSS. Transitional relief was granted for nine of the CCP sub-standards, covering matters related to: recovery, wind-down and resolution; liquidity risk management; and segregation and portability of customer positions and associated collateral. These CCP Standards came into force in March 2014. The Bank has assessed LCH.C Ltd's observance of all relevant requirements under these standards. Further detail of LCH.C Ltd's observance of each of the relevant CCP Standards is discussed in Appendix A.

3.6.1 Recovery, wind-down and resolution

Recovery and wind-down

In April 2014, the LCH.C Ltd Board approved LCH.C Ltd's Recovery Plan and its Wind-down Plan. The Recovery Plan describes how LCH.C Ltd would continue its operations if it suffered extreme losses; the Wind-down Plan describes how it would cease its operations. LCH.C Ltd has identified two broad scenarios that could potentially trigger these plans: losses arising from clearing participant defaults; and non-clearing-participant-default losses.

The Recovery Plan indicates that LCH.C Ltd would largely utilise existing rules and working practices in a recovery situation. The Plan includes additional analysis to consider the risks of applying these rules and working practices in times of market stress. With respect to losses arising from clearing participant defaults, the Recovery Plan describes how prefunded resources would be used to meet the losses and how uncovered losses would be met. The Recovery Plan also sets out the trigger for individual service closure, which could occur while leaving the remaining services operational. LCH.C Ltd introduced new rules in May 2014 to allocate investment-related losses caused by the default of an issuer of a debt instrument or an investment counterparty. The rule allocates the first €15 million of such losses to LCH.C Ltd and the remaining losses to clearing participants in proportion to each clearing participant's average share of initial margin.

The Wind-down Plan includes detailed estimates of how LCH.C Ltd would shut down its operations and how long this would take. In the case of a non-clearing-participant-default loss, wind-down would be triggered by regulatory order or if LCH.C Ltd was at risk of becoming insolvent. The decision to wind-down LCH.C Ltd would ultimately be made by the LCH.C Ltd Board, although a number of bodies would be consulted, such as shareholders, the LCH.C Group Board and regulators.

Both the Recovery Plan and the Wind-down Plan will be reviewed annually and following material changes to LCH.C Ltd's business model, rules and procedures. Reviews will be coordinated by the Chief Operating Officer (COO) and approved by the LCH.C Ltd Board. The COO is also responsible for overseeing implementation of the Recovery Plan and Wind-down Plan, in conjunction with the LCH.C Ltd Management Committee and Board. The plans, and their governance, are discussed in more detail in Appendix A (CCP Standard 3.5).

Resolution

Since LCH.C Ltd is a UK-based CS facility, any crisis management actions would be expected to be led by the UK resolution authority, the BoE. Legislation establishing a resolution regime for UK CCPs received Royal Assent in December 2012, although the relevant legislative provisions are not yet in

force and the UK authorities are developing supporting secondary legislation that will establish the date on which the resolution regime for CCPs will enter into force. The crisis management arrangements that would apply to LCH.C Ltd have important implications for all jurisdictions in which LCH.C Ltd operates, including for Australia, and it is expected that LCH.C Ltd's crisis management will be discussed further with the BoE and other regulators. In addition, LCH.C Ltd's crisis management arrangements form part of the Bank's regulatory priorities for LCH.C Ltd.

3.6.2 Liquidity risk management

LCH.C Ltd has arrangements in place to ensure that it has access to sufficient liquid resources to meet its projected payment obligations on time in the event that the two participants and their affiliates that would generate the largest aggregate payment obligations were to default in extreme but plausible scenarios. LCH.C Ltd projects its liquidity needs through liquidity stress testing, and during the Assessment period introduced a framework to reverse stress test its liquid resources. The Bank expects LCH.C Ltd to continue to enhance this framework so that it can demonstrate how its approach to modelling variation margin outflows for the purposes of liquidity stress testing captures a sufficient range of extreme but plausible scenarios.

The actions that LCH.C Ltd would take to address a liquidity shortfall or replenish its liquidity resources are described in the LCH.C Ltd Liquidity Plan and in LCH.C Ltd's Recovery Plan.

LCH.C Ltd has applied to the Bank to open an ESA. LCH.C Ltd proposes to use its ESA to manage its Australian dollar liquidity requirements. The Bank expects to continue to engage with LCH.C Ltd as it refines its Australian dollar liquidity model.

Recommendation. LCH.C Ltd should use its reverse stress-testing framework to demonstrate how its approach to modelling variation margin outflows for the purposes of liquidity stress testing captures a sufficient range of extreme but plausible scenarios.

3.6.3 Segregation and portability

LCH.C Ltd introduced new account structures during the Assessment period in order to comply with EMIR regulations. LCH.C Ltd's SwapClear service now offers three broad types of customer accounts: an individually segregated account (ISA); an omnibus segregated account (OSA) using gross margin; and an OSA using net margin.¹⁷ The accounts differ in the extent to which individual customers' positions and collateral are segregated from those of other customers (i.e. the degree of protection from fellow customer risk) and the probability that a customer's positions could be ported (see CCP Standard 13 in Appendix A).

The assets of customers that have opted to use an ISA are protected using the 'asset segregation' model. Under this model, specific assets lodged as collateral by a particular customer are recorded to that customer's individual account. In the event of the default of the customer's clearing participant, those specific assets could be ported to another clearing participant along with its positions. This contrasts with the 'value segregation' model, under which the value of a non-defaulting customer's lodged collateral is protected, but the customer might not be returned the specific assets that it had

¹⁷ SwapClear also offers the US Commodity and Futures Trading Commission (CFTC)-recognised Futures Commission Merchant (FCM) model of clearing participation. Clearing services are offered to customers using the legally separated operationally comingled (LSOC) model. This model seeks to legally segregate customers from other customers, and to ensure that in the event of a default a customer's positions and assets cannot be used to meet the obligations of any other party.

lodged. In addition, SwapClear now offers account segregation for indirect customers (i.e. the customers of clearing participants' customers).

LCH.C Ltd has arrangements in place that are intended to make it highly likely that a defaulting clearing participant's customer's positions and collateral could be ported to another clearing participant.

3.7 Material Developments Relevant to LCH.C Ltd's SwapClear Service

3.7.1 Legal basis

EMIR authorisation

As discussed in Section 3.4, the EU has introduced a harmonised framework for the regulation of FMIs (including CCPs) incorporated in the region, EMIR. On 12 June 2014, the BoE granted LCH.C Ltd authorisation under EMIR. This authorisation permits LCH.C Ltd to continue providing its current clearing services (including SwapClear), and formally subjects it to the requirements of EMIR.

LCH.C Ltd made a number of material changes to its policies and practices during the EMIR application process. These included, among others: changes to governance arrangements; introducing EMIR-compliant account structures for segregation and portability of customer positions; introducing a wind-down plan and ensuring sufficient capital is held to cover business risk losses; enhancing model validation practices; the introduction and enhancement of tools to limit procyclicality; and implementing changes to record keeping and regulatory reporting. Many of these material changes also enhance LCH.C Ltd's compliance with the CCP Standards, and are discussed Section 3.6 and the remainder of Section 3.7 below. In addition, LCH.C Ltd has introduced a revised, EMIR-compliant Rulebook, which implements many of the changes discussed above. The revised Rulebook came into effect on the day of LCH.C Ltd's EMIR authorisation.

LCH.C Ltd's application for EMIR authorisation did not cover clearing for the market operated by FEX. LCH.C Ltd is currently engaging with the BoE regarding offering clearing services to this market.

Authorisation in the United Kingdom

Within the UK, LCH.C Ltd is regulated under the UK FSMA. On the same date as it authorised LCH.C Ltd under EMIR, the BoE recognised LCH.C Ltd as a 'recognised central counterparty' under FSMA. As discussed in Section 3.4, the UK regime for CCPs was amended in early 2013 to adopt the provisions of EMIR, as well as several other recognition requirements specifically for CCPs. Until the time of its authorisation, LCH.C Ltd was formally subject to the 'recognition requirements for clearing houses', which are less comprehensive than the provisions in EMIR.¹⁸

The UK recognition requirements were further amended in July 2013 to require CCPs to: adopt loss allocation rules for default losses and to have recovery plans in place; and have rules or other effective arrangements in place to address losses from other sources that could threaten the CCP's solvency. These requirements became effective in February and May 2014, respectively. LCH.C Ltd addresses these requirements in its Rulebook and Recovery Plan (which was approved by the

¹⁸ Nevertheless, in its published statement on its supervisory approach, the BoE stated that during the transitional phase prior to authorisation, it would be guided by the requirements of EMIR and the Principles when conducting its oversight of UK CCPs.

LCH.C Ltd Board in April 2014). The Bank's CCP Standards impose similar requirements; LCH.C Ltd's compliance with these is described in Section 3.6 and Appendix A (CCP Standard 3).

3.7.2 Governance

Senior executive and board changes

There were a number of senior management changes within LCH.C Group and LCH.C Ltd during the Assessment period. Following the resignation of Ian Axe from the role of Chief Executive Officer (CEO) of LCH.C Group and LCH.C Ltd in July 2013, Suneel Bakhshi was appointed CEO of LCH.C Group and Michael Davie was appointed CEO of LCH.C Ltd. Michael Davie also continued to hold the role of CEO of SwapClear until March 2014, when he was replaced by Daniel Maguire.

In the first half of 2014, LCH.C Ltd appointed Jonathan Eliot and Simon Davies to the LCH.C Ltd Board as independent non-executive directors. With these appointments, the LCH.C Ltd Board comprises the Group CEO, the Group Chief Risk Officer (CRO), the LCH.C Ltd CEO, two directors connected to exchanges or similar, two directors connected to users, and five independent non-executive directors (one of whom is the Chairman of the LCH.C Ltd Board).

Establishment of the LCH.C Ltd management committee

LCH.C Ltd established the LCH.C Ltd Management Committee in October 2013. The Committee's main responsibilities are to:

- assist the LCH.C Ltd CEO in carrying out his responsibilities
- review matters requiring approval from the LCH.C Ltd Board prior to presenting them to the Board
- oversee the LCH.C Ltd Operating Committee, LCH.C Ltd Executive Risk Committee (ERCo)¹⁹ and LCH.C Ltd Financial Committee, which are sub-committees of the Management Committee
- make recommendations relating to risk management, strategy, financial management and the findings of internal and external audit.

The Committee, which meets at least twice a month, is chaired by the LCH.C Ltd CEO, and comprises LCH.C Ltd senior executives, as well as two representatives from LCH.C Group. The establishment of this executive-level Committee has not altered the responsibilities or flows of information to the LCH.C Ltd Board-level committees (e.g. the Risk and Audit Committees).

The SwapClear Banks

LCH.C Ltd has been working with a group of 14 of the largest global banks, who have provided expertise, financial resources and strategic direction to LCH.C Ltd's SwapClear service.²⁰ The SwapClear Banks' role in SwapClear was defined in an agreement established with LCH.C Ltd most recently entered into in 2010, under which the governance, costs and financial returns of SwapClear were shared. In April 2014, the agreement was amended to substantially change the SwapClear

19 Each of the LCH.C Group CCPs has an ERCo. These all meet jointly as a LCH.C Group-level ERCo, which is the committee responsible for the management of risks across LCH.C Group and the Group CCPs, including ensuring risks remain within LCH.C Group's stated risk appetite.

20 The SwapClear Banks are as follows: Bank of America Securities Limited, Barclays Bank plc, BNP Paribas, Citigroup Global Markets Limited, Credit Suisse AG (acting through its Guernsey Branch), DB UK Holdings Limited, The Goldman Sachs Group Inc., HSBC Bank plc, J.P. Morgan Financial Investments Limited, Merrill Lynch International, Morgan Stanley Fixed Income Ventures Inc., Nomura European Investment Limited, The Royal Bank of Scotland plc, Société Générale and UBS AG (acting through its London Branch).

Banks' role – in particular, changing their role in the governance of SwapClear from a directive to a consultative function. The revised agreement, which is summarised on LCH.C Ltd's website, also altered the financial arrangements between LCH.C Ltd and the SwapClear Banks.

Establishment of the Australian Member User Group

LCH.C Ltd formed the AMUG for Australian direct clearing participants in March 2014. The AMUG provides a formal structure for LCH.C Ltd and Australian clearing participants to discuss policy and risk management issues (see Section 3.5 for a more detailed discussion).

Processes for making rule changes

In June 2014, LCH.C Ltd formalised its processes for making rule changes by establishing a Rules Change Committee. This process is now set out in Regulation 44 in LCH.C Ltd's revised Rulebook (discussed above). The Rules Change Committee is responsible for approving all proposed changes to the Rulebook and determining the appropriate level of consultation with members on proposed changes. The Committee comprises representatives from LCH.C Ltd's Legal and Compliance departments, including the Head of Legal and the Chief Compliance Officer, as well as a business representative.

During the Assessment period, LCH.C Ltd also amended its Rulebook and Clearing Membership Agreement (a legally binding agreement between LCH.C Ltd and its clearing participants) to remove the requirement that LCH.C Ltd ballot clearing participants regarding certain rule changes. Previously, LCH.C Ltd needed to obtain written consent from at least 50 per cent of SwapClear's participants to make material changes to SwapClear's rules on default management, including to the size of SwapClear's default fund. LCH.C Ltd will nevertheless continue to consult with participants when proposing rule changes.

3.7.3 Credit risk

Internal credit scores

Under its Group Counterparty Credit Risk policy, LCH.C Ltd assigns ICSs to its counterparties. Based on their performance in a range of areas, such as financial ratios and operations, counterparties are assigned a score between 1 and 10, with 1 representing the highest credit quality. The ICS is a key tool used by LCH.C Ltd to determine the exposures it will accept against a given counterparty; it also determines the intensity of LCH.C Ltd's ongoing monitoring of that counterparty.

In February 2014, the LCH.C Ltd Board approved changes to the Group Counterparty Credit Risk policy, notably extending its application beyond clearing participants to a number of other counterparties, including investment counterparties and custodians. The revised policy also introduced a tailored framework for assigning ICSs to sovereigns and interoperating CCPs.

In revising the policy, LCH.C Ltd made modifications to the framework for assigning ICSs to particular types of counterparty, notably to reduce the weight on external credit ratings and market implied ratings (default probabilities inferred from market data), and increase the weight on LCH.C Ltd's own assessments of the counterparty's default risk. Additionally, the frequency with which ICSs are reviewed was increased, to a minimum of once each year.

The revised policy was externally validated in the fourth quarter of 2013 and found to be fit for purpose.

Model validation and review

LCH.C Group maintains a Model Governance, Validation and Review Policy, which applies to margin models, models used for valuing financial products guaranteed by LCH.C Ltd or received as collateral, and models used for assigning ICSs. The policy sets out the process by which LCH.C Ltd adopts new models, changes its existing models, conducts regular model validations and monitors the performance of its models with back-testing.

The policy specifies that independent model validation is required when adopting a new model or making a material change to an existing model. In February 2014, LCH.C Group amended this aspect of the policy to allow for such validations to be performed by the Independent Model Validation Team, which is a team within LCH.C Group that is not involved in building or testing the model. The team reports to the Finance Group and is independent of the Risk Group. The policy allows for model validation by an external party, although this is not required. Previously, validations were performed by an external party, except in the case of changes to low-importance models (defined as models that would not lead to a shortfall in a margin or haircut if they were incorrect). The revised policy also specifies that all models covered by the policy must be reviewed at least annually by the Independent Model Validation Team. The next validation of the SwapClear initial margin model is scheduled for late 2014.

The amendments to the policy also increase the involvement of senior management in model reviews and validation. In particular, the amendments clarify that approval by the relevant Board is required before a new model is introduced, or before a material change is made to any existing model (other than those deemed to be of low importance).

LCH.C Ltd conducts daily and monthly back-testing of initial margin models to monitor their performance, using both static observed portfolios and hypothetical portfolios. LCH.C Ltd examines all breaches and near-misses. If numerous breaches occur, or if a specific member or customer has consecutive breaches, the issue will be escalated within LCH.C Ltd. LCH.C Ltd may then call additional margin from specific members or review its initial margining methodology. The Model Governance, Validation and Review Policy now requires that back-testing results be reported monthly to the ERCO and quarterly to the Risk Committee; results were previously reported only to the Market Risk Management Committee (MRMC).²¹

The Model Governance, Validation and Review Policy does not cover LCH.C Ltd's processes for reviewing and validating its liquidity risk and collateral haircut models; these are set out in LCH.C Ltd's liquidity risk and collateral risk policies, respectively. These policies were amended in June 2014 to add substantial detail on the frequency, scope and internal governance of reviews and validations of these models. The Model Governance, Validation and Review Policy is also distinct from LCH.C Ltd's policies for validating its stress-testing models and conducting reverse stress testing, which are discussed below.

Review of SwapClear stress-testing model

In December 2013, an independent review of the stress tests used to size the SwapClear default fund was completed. The review found that SwapClear's current and proposed historical and theoretical stress scenarios fell within a 'reasonable interpretation' of extreme but plausible. However, a number of recommendations were proposed and have now been implemented.

21 The MRMC is responsible for assisting the LCH.C Group Head of Market Risk in the management of market risk at LCH.C Group and its subsidiaries. The Group comprises senior executive staff from across LCH.C Group.

Reverse stress testing

During the Assessment period, LCH.C Ltd implemented a reverse stress-testing framework to assess the adequacy of its default and liquidity resources, as contemplated in the guidance to CCP Standards 4 and 7. Reverse stress testing falls under the broader LCH.C Group Financial Resource Adequacy policy, as one of the tools used to assess the adequacy of each CCP's financial resources. The reverse stress-testing framework, which applies across each of the LCH.C Group CCPs, broadly establishes how LCH.C Ltd will identify and assess the plausibility of scenarios that could lead to losses in excess of the CCP's existing resources. Scenarios considered include: the default of multiple clearing participants; extreme market moves; and impaired access to liquidity. If such plausible scenarios were identified, LCH.C Ltd would consider increasing its resources and amending its stress-testing framework.

Reverse stress testing is conducted at least quarterly, and the results are reviewed by ERCo.

3.7.4 Collateral

Banking and collateral management system

During the Assessment period, LCH.C Ltd completed the implementation of its new liquidity and collateral management system. Phase II of the system's implementation was completed in May 2014 when LCH.C Ltd's collateral management was transferred from the legacy system; an earlier stage of the system's implementation (Phase I) transferred LCH.C Ltd's cash and liquidity management. The new system now supports the cover distribution process (which is the process by which lodged collateral is allocated to cover margin requirements), PPS calls and SWIFT messaging, the management of non-cash collateral, and internal and external messaging and reporting. The project has created a common collateral and liquidity management platform across LCH.C Ltd and LCH.C LLC.

Collateral haircuts

To reflect credit risk not captured by its base haircut model, LCH.C Ltd applies add-ons to the haircuts on sovereign debt received as collateral. In May 2014, LCH.C Ltd changed its methodology for setting this 'sovereign credit risk haircut add-on', in part reflecting the introduction of its ICS framework for sovereigns (see Section 3.7.3 above). Under the new policy, sovereigns may be subject to a credit add-on based on their ICS. Changes to credit risk add-ons take effect with a delay, typically of two weeks, to limit the procyclical impact of the change.

3.7.5 Margin

Introduction of an initial margin floor to reduce procyclicality

SwapClear calibrates initial margin to cover potential losses over a 5 day liquidation period with 99.7 per cent confidence, based on historical movements in yield curves and exchange rates over a 10-year look-back period. The model contains features intended to moderate procyclical margining changes, such as the use of a relatively long look-back period and exponentially weighted moving average volatility scaling. In May 2014, LCH.C Ltd introduced an initial margin floor as an additional measure to mitigate procyclicality. LCH.C Ltd calculates the margin floor corresponding to each participant's portfolio on a daily basis. The floor is calibrated to cover potential losses over a 5 day liquidation period with 99.5 per cent confidence, based on a 10-year look-back period, without scaling historical observations.

Sensitivity analysis

LCH.C Group introduced a framework for conducting sensitivity analysis on its margin models, effective from the fourth quarter of 2013. The primary objective of this testing program is to assess the adequacy of key margin model parameters (volatility, correlations, decay factors, returns) and assumptions on an ongoing basis.

All sensitivity tests are performed on either a monthly or a quarterly basis.

The results, analysis and conclusions of each test are presented to the Model Working Group (MWG)²² and MRMC each quarter for review. These results may prompt the MWG and MRMC to recommend model changes; to date the sensitivity analysis conducted for the SwapClear margin model has not prompted any changes to the model assumptions.

3.7.6 Liquidity risk

Cap on participants' use of liquid resources

In the second half of 2013, LCH.C Ltd introduced a concentration framework to ensure sufficient liquidity is available within each service. The framework seeks to limit the total non-cash collateral a participant can post relative to LCH.C Ltd's available liquid resources. The framework is monitored by Collateral and Liquidity Management (CaLM); the Asset and Liquidity Committee (ALCo) is responsible for determining how any breaches to the framework should be resolved.

Intraday liquidity stress testing

LCH.C Ltd introduced intraday liquidity stress testing in late 2013. The tests are used to assess the intraday 'liquidity coverage ratio' (LCR) at various intervals throughout the day, aligned with times at which LCH.C Ltd has scheduled settlement cycles or obligations to pay (see CCP Standard 7 in Appendix A for details of LCH.C Ltd's daily stress-testing model).

The results of intraday stress testing are reported to the Risk, CaLM, Finance, Compliance and Collateral teams within LCH.C Ltd each day. Results are also discussed with senior management in the Risk, CaLM and Finance divisions on a weekly and monthly basis. The intraday stress-testing model will be reviewed quarterly, with the results reported to ALCo.

LCH.C Ltd commissioned an external independent validation of its intraday liquidity stress-testing model in late 2013. This review followed an independent validation of LCH.C Ltd's broader liquidity risk model (including its full liquidity stress-testing model), which was conducted during the fourth quarter of 2013. The reviewer found the intraday stress-testing model to be fit for purpose.

3.7.7 Default management

LCH.C Ltd conducts SwapClear default management Fire Drills every six months for SwapClear and its participants to practise aspects of the default management processes. Australian clearing participants took part in two Fire Drills during the Assessment period, in November 2013 and May 2014. In each test, SwapClear generated auction packs (i.e. hypothetical portfolios) and participants were required to import and reconcile trade files and reports, value the auction packs and bid for each auction pack.

22 The MWG consists of quantitative experts from across LCH.C Group. Its role is to support the MRMC and ERCo in the consideration of the effectiveness of quantitative models and risk management methodologies, including model development, validation and testing.

3.7.8 Operational risk

Operational risk reviews

LCH.C Ltd commissions reviews of its operational risk environment from time to time. LCH.C Ltd is currently undertaking such a review, which is scheduled to be completed in August 2014.

In late 2013, LCH.C Ltd completed an internal review of operational risk in SwapClear. None of the review's recommendations were identified as business critical. The LCH.C Group Operations Committee has accepted all of the review's recommendations and allocated a budget for their implementation.

Cyber risk

Over the past 12 months, LCH.C Group has undertaken a number of reviews and exercises to increase its resilience against cyber attacks. In September 2013, an independent party conducted a review of LCH.C Group's cyber security. This review made a number of recommendations around governance and technology, which have since been implemented. LCH.C Group also commissioned a consulting firm to run a cyber attack exercise, which ran in October 2013. The firm found that the LCH.C Group Crisis Management Team (CMT) performed well overall; LCH.C Group has since implemented the recommendations resulting from the exercise, which focused on internal and external communication.

Additionally, LCH.C Ltd has collaborated with UK financial institutions and regulators to increase system-wide cyber resilience. In November 2013, LCH.C Ltd participated in 'Waking Shark II', a cyber attack exercise with participants from across the UK financial system. The exercise resulted in a publicly available report that recommends measures for increased collaboration on cyber resiliency. As discussed in Section 3.4, cyber risk is one of the BoE's supervisory priorities. As part of its work, the BoE has reviewed cyber risk in UK FMIs, including LCH.C Ltd.

LCH.C Ltd also conducts regular tests of its information technology (IT) infrastructure.

Appendix A: Detailed Assessment of LCH.Clearnet Limited against the Financial Stability Standards

Introduction

This Appendix assesses LCH.C Ltd's SwapClear service against the CCP Standards that came into effect since the Bank's last assessment in June 2013.²³

Standard 3: Framework for the Comprehensive Management of Risks

A central counterparty should have a sound risk management framework for comprehensively managing legal, credit, liquidity, operational and other risks.

LCH.C Ltd has identified two broad scenarios that could potentially prevent it from being able to provide its critical operations and services as a going concern: exposure to losses arising from clearing participant defaults; and non-clearing-participant-default losses. LCH.C Ltd's Recovery Plan sets out how it would continue its operations if it suffered extreme losses, and its Wind-down Plan sets out how it would cease its operations in an orderly way. It is expected that the resolution arrangements that would apply to LCH.C Ltd following a crisis will be discussed further with the BoE and other regulators over coming months.

3.5 A central counterparty should identify scenarios that may potentially prevent it from being able to provide its critical operations and services as a going concern and assess the effectiveness of a full range of options for recovery or orderly wind-down. A central counterparty should prepare appropriate plans for its recovery or orderly wind-down based on the results of that assessment. Where applicable, a central counterparty should also provide relevant authorities with the information needed for purposes of resolution planning.

LCH.C Ltd has a Recovery Plan and Wind-down Plan that sets out how it would continue or cease, respectively, its operations if it suffered extreme losses. The Recovery and Wind-down Plans apply to all of LCH.C Ltd's services, although individual services could be wound down while other services continued operating. LCH.C Ltd has identified two broad scenarios that could potentially trigger these plans: exposure to losses arising from clearing participant defaults; and non-clearing-participant-default losses arising from, for example, fraud or treasury investment losses.

²³ RBA (2013), *Assessment against the Financial Stability Standards for Central Counterparties of LCH.Clearnet Limited's SwapClear Service*, June. Available at <<http://www.rba.gov.au/payments-system/clearing-settlement/assessments/lch/>>.

LCH.C Ltd discusses these scenarios and the ways that it would respond to them in detail in its Recovery Plan and Wind-down Plan. In addition, the Wind-down Plan describes how LCH.C Ltd would voluntarily cease operating.

Recovery

The Recovery Plan sets out how LCH.C Ltd would continue its operations if it suffered extreme losses. The Plan largely utilises existing rules and working practices, with additional analysis to consider the risks of applying these rules and working practices in times of market stress.

The LCH.C Ltd Board approved the Recovery Plan in April 2014. The Recovery Plan was developed by the Recovery and Resolution Plan Programme (RRP) Board, which consisted of senior representatives from across the LCH.C Group from compliance, finance, risk, legal and CaLM. The RRP Board was established only for the initial creation of the Recovery Plan; subsequent reviews of the plan will be coordinated by the COO and approved by the LCH.C Ltd Board. The Recovery Plan will be reviewed annually and following material changes to LCH.C Ltd's business model, rules and procedures. The Bank also expects LCH.C Ltd to review its Recovery Plan in light of CPSS-IOSCO guidance on recovery, when finalised. The COO is also responsible for overseeing implementation of the Recovery Plan, in conjunction with the LCH.C Ltd Management Committee and Board.

The Recovery Plan discusses the circumstances in which it would be triggered and the recovery tools that would be available. In the event of a clearing participant default, the Recovery Plan would be triggered when prefunded default funds for a given service were exhausted. In the event of a non-clearing-participant-default loss, the Recovery Plan would be triggered by treasury investment losses greater than €15 million arising from the default of an issuer of a debt instrument (such as a sovereign) or the default of an investment counterparty. It would also be triggered by operational or general business risk losses that consumed the regulatory capital that LCH.C Ltd holds against these risks. Finally, the Recovery Plan would be triggered by liquidity shortfalls that arose from a clearing participant default or non-clearing-participant-default loss.

With respect to uncovered credit losses and replenishment in the SwapClear service, LCH.C Ltd has powers to call funds from non-defaulting clearing participants (see Standard 4.8 for more information). First, it has powers to call for Unfunded Contributions from non-defaulting clearing participants to the value of their last default fund contribution, once for each default, subject to a maximum of three defaults in any six-month period. Second, LCH.C Ltd would invoke its Loss Distribution Process and subject the cumulative net gains owed to non-defaulting clearing participants to haircuts. This process would end if the amount called from a single non-defaulting clearing participant reached the higher of £100 million or the value of its previous default fund contribution (unless this cap was raised by way of all non-defaulting clearing participants agreeing to this). Third, LCH.C Ltd would ask non-defaulting clearing participants to make voluntary contributions. If insufficient voluntary payments were made to cover the remaining credit losses, LCH.C Ltd would close the SwapClear service and remaining credit losses would be allocated to non-defaulting participants on a pro-rata basis.

LCH.C Ltd also has rules in place to ensure, once the default management process was complete, that the SwapClear default fund would be replenished by contributions from non-defaulting clearing participants within two days to at least the value of the SwapClear default fund floor, which is currently set at £1 billion. The default fund would be replenished to its full level after 30 days.

If a default at the SwapClear service (or any individual service) was large enough to exhaust the specified default resources available for that service, that individual service could be closed while leaving the remaining services operational.

LCH.C Ltd has recently determined, for the purposes of complying with separate UK legislation, the potential non-clearing-participant-default loss events that are considered solvency-threatening. Accordingly, it has identified the tools to recover from these scenarios as shown below.

- *Investment-related losses caused by the default of an issuer of a debt instrument or an investment counterparty.* The first €15 million of such a loss would be allocated to LCH.C Ltd, with the remainder allocated to clearing participants in proportion to each clearing participant's average margin weight. Rules to allocate investment losses to clearing participants came into force in May 2014.
- *Other non-clearing-participant-default losses.* LCH.C Group holds insurance policies that provide protection against various operational and business risks. LCH.C Ltd also holds capital against business and operational risks. It could also utilise its surplus capital to cover any remaining losses.

LCH.C Ltd has undertaken analysis of underlying structural weaknesses that could contribute to non-clearing-participant-default losses. This analysis identified two types of weaknesses: operational issues, such as the failure of a settlement bank; and general business risks, such as the poor performance of a business line. It has addressed operational issues through contingency plans embedded in its Business Continuity and Recovery Plans and the Group Settlement, Payment and Custodian Risk Policy. The LCH.C Ltd Management Committee is responsible for overseeing general business risks.

LCH.C Ltd has a number of tools to deal with liquidity shortfalls that would be caused by a clearing participant default or non-clearing-participant-default loss. These tools are discussed in CCP Standard 7.9.

LCH.C Ltd has a capital raising strategy in place that would replenish capital used in loss allocations as part of the Recovery Plan. Capital would likely be raised by LCH.C Group and provided to LCH.C Ltd rather than raised directly by LCH.C Ltd.

Wind-down

The Wind-down Plan sets out how LCH.C Ltd would cease its operations in the event of a clearing participant default, a non-clearing-participant-default loss, or a decision to wind-down voluntarily. The plan includes detailed estimates of how LCH.C Ltd would shut down its operations and how long this would take, which affects the amount of capital that must be set aside for this purpose (see CCP Standard 14.3). The Wind-down Plan was approved in April 2014 by the LCH.C Ltd Board. The Wind-down Plan will be reviewed at least annually or more frequently if there is a material change to LCH.C Ltd's business model; reviews will be coordinated by the COO and approved by the LCH.C Ltd Board.

The decision to wind-down LCH.C Ltd would ultimately be made by the LCH.C Ltd Board, although a number of bodies would be consulted, such as shareholders, the LCH.C Group Board and regulators. With respect to regulators, LCH.C Ltd would primarily consult with the BoE; in turn, it would be expected that the BoE would be involved in discussions with the EMIR and Global Colleges and with the CFTC.

With respect to clearing participant defaults, LCH.C Ltd has determined that its viability would only be likely to be threatened by the closure of several services. In the case of a non-clearing-participant-default loss, wind-down would be triggered by regulatory order or if LCH.C Ltd was at risk of becoming insolvent.

The Wind-down Plan contains estimates of the time it would take LCH.C Ltd to close its operations under the various scenarios, differentiating between the time taken to close critical and non-critical support functions. LCH.C Ltd has determined that it could complete wind-down in less than six months. This would include a period in which clearing participants would be required to flatten their positions so that there were no positions outstanding at the end of the notified termination period. Clearing participants would only be permitted to place new positions in order to close out existing positions or if LCH.C Ltd accepted new positions to help to reduce market impact. Under all scenarios, all staff would become subject to redundancy processes when their roles were no longer required. LCH.C Ltd has plans in place to ensure that key personnel would be retained through the wind-down process.

Resolution

As LCH.C Ltd is a UK-based CS facility, resolution would be expected to be led by the UK's resolution authority, the BoE. Legislation establishing a resolution regime for UK CCPs received royal assent in December 2012, although the relevant legislative provisions are not yet in force and the UK authorities are developing supporting secondary legislation that will establish the date on which the resolution regime for CCPs will enter into force. The crisis management arrangements that would apply to LCH.C Ltd have important implications for all jurisdictions in which LCH.C Ltd operates, including for Australia, and it is intended that LCH.C Ltd's recovery plans and crisis management will be considered further in conjunction with the BoE and other regulators.

Standard 4: Credit Risk

A central counterparty should effectively measure, monitor and manage its credit exposures to participants and those arising from its clearing processes. A central counterparty should maintain sufficient financial resources to cover its credit exposure to each participant fully with a high degree of confidence.

LCH.C Ltd has rules and procedures in place that address how it would meet losses from clearing participant defaults. It has prefunded financial resources from: the defaulting clearing participant's margin; LCH.C Ltd's own resources; and the SwapClear default fund. If those resources were insufficient to meet the losses, LCH.C Ltd has powers to: call for further contributions from non-defaulting clearing participants; withhold amounts owed to non-defaulting clearing participants with cumulative net gain positions; and ask non-defaulting clearing participants to make voluntary contributions. LCH.C Ltd also has powers to call non-defaulting clearing participants for funds to ensure that the SwapClear default fund is at or above its minimum size after the SwapClear Default Management Process was completed. The determination of SwapClear default fund contributions would revert to the usual resizing method 30 days after the SwapClear Default Management Process was completed.

4.8 A central counterparty should establish explicit rules and procedures that address fully any credit losses it may face as a result of any individual or combined default among its participants with respect to any of their obligations to the central counterparty. These rules and procedures should address how potentially uncovered credit losses would be allocated, including the repayment of any funds a central counterparty may borrow from liquidity

providers. These rules and procedures should also indicate the central counterparty's process to replenish any financial resources that the central counterparty may employ during a stress event, so that the central counterparty can continue to operate in a safe and sound manner.

Allocation of credit losses

LCH.C Ltd's SwapClear service has rules and procedures that set out how it would cover losses from a defaulting clearing participant. The first level of protection is its prefunded financial resources, which would be applied in the following order:

- the defaulting clearing participant's margin across all services
- the defaulting clearing participant's default fund contributions across all services
- LCH.C Ltd's own resources (€36 million)
- non-defaulting clearing participants' default fund contributions (as of 30 June 2014, £2.3 billion minus the value of the defaulting clearing participant's contribution).

If the losses were greater than the size of these resources, the service continuity processes within the Default Management Process would be utilised to cover the uncovered credit losses (see Standard 3.5 for more information).

- First, SwapClear would have powers to call non-defaulting clearing participants for Unfunded Contributions if the default fund was reduced, or if SwapClear determined that it would be likely to be reduced, by 25 per cent or more. The value of Unfunded Contributions for each default would be capped at the value of each non-defaulting clearing participant's last default fund contribution and subject to a maximum of three defaults in any six-month period.
- Second, SwapClear would have powers to invoke its Loss Distribution Process if uncovered losses remained unallocated. Under this process, SwapClear would allocate uncovered credit losses by not paying the full amount that non-defaulting clearing participants with cumulative net gains since the default (from variation margin, coupons, fees and price alignment interest) were due. Payments to non-defaulting clearing participants with cumulative net gain positions would be determined by the distribution haircut fraction, which is the value of the uncovered loss divided by the total cash gain. At the same time, non-defaulting clearing participants with cumulative net loss positions would be expected to pay the full amount. The Loss Distribution Process would continue each day until the defaulting clearing participant's trades were successfully auctioned and transferred under the SwapClear Default Management Process. The Loss Distribution Process would end if the loss applied to a single non-defaulting clearing participant reached the higher of £100 million or the value of its previous default fund contribution, although this cap could be increased by the agreement of all non-defaulting clearing participants.
- Third, SwapClear could request that non-defaulting clearing participants make voluntary payments if the Loss Distribution Process cap was reached and uncovered losses remained unallocated. The voluntary payments stage would allow clearing participants or a subset of clearing participants to provide additional funds to keep the service open without requiring unanimous consent from clearing participants. Non-defaulting clearing participants would not be obliged to make voluntary payments and could continue to be SwapClear clearing participants if they did not contribute. LCH.C Ltd acknowledges in the Recovery Plan that there would be a coordination risk associated with this process because clearing participants might refuse to contribute if they expected other clearing participants to do the same.

If insufficient voluntary payments were made to cover the remaining credit losses, SwapClear would make an Insufficient Resources Determination and close the SwapClear service (see Standard 3.5). If the SwapClear service were wound down, all outstanding SwapClear contracts would be closed. SwapClear would unwind payments withheld as part of the Loss Distribution Process and calculate a sum owing between it and each non-defaulting clearing participant. Clearing participants that owed funds would be obliged to pay in full. If there were insufficient funds to meet the claims of participants that were owed funds, these claims would be reduced pro rata. Separately, each clearing participant would be entitled to the return of its cash initial margin, and the amount owed to or from a clearing participant would be set off against the return of any cash initial margin to form a net sum. Non-cash collateral would be returned separately.

Replenishment

SwapClear has rules and procedures to replenish the default fund when the SwapClear Default Management Process is completed. If the value of the SwapClear default fund was lower than the SwapClear Fund Floor (i.e. the minimum size of the default fund – currently set at £1 billion) when the SwapClear Default Management Process was completed, SwapClear would call non-defaulting clearing participants for Supplementary Contributions in order to bring the SwapClear default fund up to no less than the SwapClear Fund Floor. The determination of SwapClear default fund contributions would revert to the usual resizing method 30 days after the SwapClear Default Management Process was completed.

Standard 7: Liquidity Risk

A central counterparty should effectively measure, monitor and manage its liquidity risk. A central counterparty should maintain sufficient liquid resources in all relevant currencies to effect same-day and, where appropriate, intraday and multiday settlement of payment obligations with a high degree of confidence under a wide range of potential stress scenarios that should include, but not be limited to, the default of the participant and its affiliates that would generate the largest aggregate liquidity obligation for the central counterparty in extreme but plausible market conditions.

LCH.C Ltd has arrangements in place to ensure that it has access to sufficient liquid resources to meet its projected payment obligations on time in the event that the two participants and their affiliates that would generate the largest aggregate payment obligations were to default in extreme but plausible scenarios. LCH.C Ltd projects its liquidity needs through liquidity stress testing, and during the Assessment period introduced a framework to reverse stress test its liquid resources. The Bank expects LCH.C Ltd to continue to enhance this framework so that it can demonstrate how its approach to modelling variation margin outflows for the purposes of liquidity stress testing captures a sufficient range of extreme but plausible scenarios.

The actions that LCH.C Ltd would take to address a liquidity shortfall or replenish its liquidity resources are described in the LCH.C Ltd Liquidity Plan and in LCH.C Ltd's Recovery Plan.

LCH.C Ltd has applied to the Bank to open an ESA. LCH.C Ltd proposes to use its ESA to manage its Australian dollar liquidity requirements. The Bank expects to continue to engage with LCH.C Ltd as it refines its Australian dollar liquidity model.

7.3 A central counterparty should maintain sufficient liquid resources in all relevant currencies to settle securities-related payments, make required variation margin payments and meet other payment obligations on time with a high degree of confidence under a wide range of

potential stress scenarios that should include, but not be limited to, the default of the participant and its affiliates that would generate the largest aggregate payment obligation to the central counterparty in extreme but plausible market conditions. In addition, a central counterparty that is involved in activities with a more complex risk profile or that is systemically important in multiple jurisdictions should consider maintaining additional liquidity resources sufficient to cover a wider range of potential stress scenarios that should include, but not be limited to, the default of the two participants and their affiliates that would generate the largest aggregate payment obligation to the central counterparty in extreme but plausible market conditions.

Liquidity risk management by LCH.C Ltd is governed by a group-wide Group Liquidity Risk Policy. The policy is written by the LCH.C Group Risk Department and approved by LCH.C Ltd's Board. Each CCP with LCH.C Group must be able to meet its own liquidity requirements independently. LCH.C Ltd also maintains a Liquidity Plan, which describes the principles and procedures that are applied to meet the Liquidity Risk Policy. Within LCH.C Ltd, liquidity is managed at a cross-service level, as liquidity from one clearing service can be used to meet liquidity requirements in other clearing services.

LCH.C Ltd identifies two main sources of liquidity needs:

- *Operational liquidity requirements* – that is, business as usual liquidity draws, unrelated to a participant default. These include: repayment of excess cash collateral; changes in margin liabilities; substitution of cash collateral upon participant request; provision of liquidity to facilitate settlement; and an overall reduction in initial margin and thus cash posted for margin coverage.
- *Default liquidity requirements* – that is, liquidity requirements in the default of a clearing participant. These include: fulfilment of settlement obligations of the defaulting participant; posting variation margin to non-defaulting participants; potential losses due to liquidation of cleared positions and collateral; and potential investment losses if the defaulting participant is also an investment counterparty.

These liquidity requirements cover needs arising from both direct clearing participants and customers, where relevant.

Other potential draws on liquidity include disruptions in liquidity markets and settlement/payment flows.

To ensure it maintains sufficient liquid resources, LCH.C Ltd sets a 'default liquidity requirement' and daily 'operational liquidity targets' (discussed below). Together, these form LCH.C Ltd's total liquidity requirement. LCH.C Ltd must maintain a minimum LCR – that is, it must ensure that the value of its available liquid resources relative to its total liquidity requirement is above 100 per cent and a buffer amount set internally.

Monitoring the LCR, as well as other day-to-day management of liquidity risk, is the responsibility of LCH.C Ltd's Collateral and Liquidity Risk Management (CaLRM) function. Any breaches of the LCR must be notified to the ALCo and the ERCo,²⁴ and ALCo would make recommendations to address the breach (e.g. based on the options discussed in CCP Standard 7.9). CaLRM also monitors variations in the liquidity buffer (the value of available liquidity resources above the stressed liquidity requirement). A material reduction in the value of the liquidity buffer must be immediately reported

²⁴ ALCo is a sub-committee of ERCo that focuses on investment and liquidity policies. Like ERCo, it comprises representatives from each LCH.C Group CCP, and issues affecting an individual CCP are decided by the representatives of that CCP.

to ERCo, the Group CRO, the CRO of LCH.C Ltd and the head of CaLRM for LCH.C Ltd, who would determine the action required. In the case of currencies that are less actively traded within the CCP (including the Australian dollar), risk monitoring is conducted as described below.

Operational liquidity targets

To ensure that sufficient liquidity is available to meet business as usual requirements, LCH.C Ltd sets operational liquidity targets for each currency for which LCH.C Ltd considers it has meaningful operational exposures (based on internal thresholds). The targets are set assuming that the CCP will not receive additional cash from clearing participants (in any currency) – that is, only outflows are considered. LCH.C Ltd's CaLRM function is responsible for recalculating and monitoring the operational targets daily.

Default liquidity requirement

LCH.C Ltd defines the default liquidity requirement as the liquidity required in the event of the default of the two clearing participants and their affiliates that would generate the largest aggregate liquidity obligations (the cover two requirement). The default liquidity requirement is calculated daily through liquidity stress-testing. These stress tests are conducted at an aggregated level across all currencies. They are also run individually at the currency level on the most active currencies, assuming complete closure of the foreign exchange (FX) markets. Liquidity stress testing is conducted by LCH.C Ltd's CaLRM function.

The key test used to determine the default liquidity requirement is the 'daily liquidity stress test', which forecasts liquidity requirements that arise over a 30-day liquidity horizon following the default of the two clearing participants with the largest liquidity requirements. The test covers all liquidity risks related to clearing participants and their affiliates including settlement obligations, variation margin requirements and investment losses (which would arise if the defaulter was also a LCH.C Ltd investment counterparty).

- *Settlement obligations:* On the default of a clearing participant, LCH.C Ltd would assume obligations to fulfil physical settlement for its EquityClear and RepoClear services. These are fixed obligations, for which LCH.C Ltd estimates its stressed default liquidity needs based on gross cash outflows – that is, it does not allow offsets from potential cash inflows where securities were delivered to the non-defaulting members to generate cash flows. Under its contract with the London Metal Exchange (LME), LCH.C Ltd does not need to settle physically until the defaulter's positions are hedged or sold. LME is targeting a transfer of its clearing operations to LMEClear in September 2014.
- *Variation margin requirements:* Similar to settlement obligations, LCH.C Ltd will need to ensure sufficient liquidity is available to cover potential variation margin losses the defaulter's portfolio may incur before they are fully liquidated. The prevailing initial margin model in each service is used to estimate the potential loss over the liquidation period. It is assumed there is no offsetting of variation margin payments across services. During 2013/14, LCH.C Ltd implemented a reverse stress-testing framework to assess the adequacy of its liquid resources. The Bank expects to engage with LCH.C Ltd over the coming period to ensure that LCH.C Ltd can clearly demonstrate how its approach to modelling variation margin flows for the purposes of liquidity stress testing captures a sufficient range of extreme but plausible scenarios.

In addition, as part of its regular review of its liquidity stress-testing model, LCH.C Ltd intends to examine the methodology it uses in its liquidity stress-testing model to allocate variation margin

outflows across currencies. This review is scheduled to occur in the third quarter of 2014 and the Bank will expect to engage with LCH.C Ltd regarding the results.

In addition to the daily liquidity stress test, LCH.C Ltd also runs several other stress tests, including modelling the impact of restricted access to liquid resources due to closure of certain parts of the repo market. Additional tests also cover the impact of a regional economic crisis and the default of multiple clearing participants.

Sources of liquidity

LCH.C Ltd's primary sources of liquidity are cash posted by clearing participants to meet margin requirements, cash contributions to the default fund, and LCH.C Ltd's own capital. Cash is invested in line with the Group Investment Policy, predominantly in very short dated transactions with daily maturities, as well as in highly liquid government securities. Other sources of liquidity include sale or repo of assets, credit lines, liquidity facilities and FX swaps (discussed further in CCP Standard 7.9). When assessing its available liquid resources against its total liquidity requirement, LCH.C Ltd makes various assumptions regarding the availability of certain collateral to raise liquidity.

LCH.C Ltd's stress-testing results indicate it typically maintains a sizeable buffer of liquid resources beyond its stressed liquidity requirements.

Model validation

LCH.C Ltd sought independent external validation of its liquidity stress-testing model during the fourth quarter of 2013. The test concluded that the model was fit for purpose. Several recommendations were made, which have now been implemented.

Liquidity management of currencies that are less active in the CCP

Liquidity needs in currencies that are less active in LCH.C Ltd (which include the Australian dollar) are monitored daily, based on historical operational and variation margin flows. Since the majority of LCH.C Ltd's variation margin flows in these currencies arise from SwapClear, LCH.C Ltd also monitors the 'worst case loss' in SwapClear for each less active currency. This is calculated using the same PAIRS methodology for computing initial margin requirements. Observed increases in operational flows or potential exposures in these currencies are investigated by CaLRM and reported to ALCo, as required.

Management of Australian dollar liquidity

As discussed in Section 3.5, LCH.C Ltd has applied to the Bank to open an ESA. LCH.C Ltd has also applied to open an account with Austraclear to hold Australian dollar securities. LCH.C Ltd proposes to use its ESA (if approved) to manage its Australian dollar liquidity requirements.

Specifically, LCH.C Ltd proposes to access Australian dollar liquidity by holding securities eligible for repo with the Bank. These securities will be held in LCH.C Ltd's Austraclear account. LCH.C Ltd proposes to use Bank intraday facilities to manage its Australian dollar settlements on a day-to-day basis, allowing it to pay out Australian dollar variation margin prior to receiving all pay-ins. Bank repo facilities would also be used in the case that LCH.C Ltd required Australian dollar liquidity to manage a clearing participant default.

LCH.C Ltd does not currently accept Australian dollar cash as initial margin (see Section 3.5). Therefore in the first instance its Australian dollar liquidity requirements will relate only to variation margin. LCH.C Ltd proposes to hold sufficient Australian dollar securities to cover a potential outflow due to the default of the largest two clearing participants and their affiliates.

Australian dollar liquidity needs will be monitored by CaLRM as part of its day-to-day liquidity monitoring.

The Bank expects to continue to engage with LCH.C Ltd as it refines its Australian dollar liquidity model. The Bank also expects LCH.C Ltd to ensure processes are in place so that it can demonstrate the adequacy of its Australian dollar liquid resources on an ongoing basis.

7.9 A central counterparty should establish explicit rules and procedures that enable the central counterparty to effect same-day and, where appropriate, intraday and multiday settlement of payment obligations on time following any individual or combined default among its participants. These rules and procedures should address unforeseen and potentially uncovered liquidity shortfalls and should aim to avoid unwinding, revoking or delaying the same-day settlement of payment obligations. These rules and procedures should also indicate the central counterparty's process to replenish any liquidity resources it may employ during a stress event, so that it can continue to operate in a safe and sound manner.

The actions that LCH.C Ltd would take to address a liquidity shortfall or replenish its liquidity resources are described in the LCH.C Ltd Liquidity Plan and in LCH.C Ltd's Recovery Plan. The Liquidity Plan covers the tools that would be used to address what LCH.C Ltd calls 'business as usual' shortfalls, i.e. how LCH.C Ltd would fund liquidity to meet operational or default liquidity needs, as described under CCP Standard 7.3. As discussed under CCP Standard 7.3, LCH.C Ltd typically holds a substantial buffer of liquid resources in excess of those required to meet the projected operational and default liquidity requirement. Therefore LCH.C Ltd would be able to continue to use these 'business as usual tools' in the event of a liquidity stress that exceeded 'business as usual' requirements (e.g. an event beyond a cover two default). The Recovery Plan addresses the additional tools that could be applied.

LCH.C Ltd has a range of tools routinely available to manage day-to-day liquidity, all of which would also be available to address a liquidity shortfall. These include, but are not limited to: allowing investments to mature without reinvesting the proceeds (cash would be held on deposit at institutions approved under the LCH.C Group Investment Risk Policy until the liquidity requirement crystallised); sale or repo of non-cash collateral held in LCH.C Ltd's investment portfolio; accessing credit or FX lines with commercial banks; or intraday liquidity facilities with central securities depositories or international central securities depositories.

LCH.C Ltd also has access to a number of other tools, set out in its Rulebook and procedures, that give it the ability to manage the level of liquidity within the firm both under normal market conditions and during periods of reduced market liquidity. These include active management of member collateral movements such as changing the notice period and/or approval limits for collateral substitutions, as well as prioritisation regarding the return of excess collateral. LCH.C Ltd also has the ability under its Rulebook to change the currency in which it settles obligations; this might enable LCH.C Ltd to resolve a situation in which there was a liquidity shortfall in a specific currency. LCH.C Ltd would prioritise the various tools depending on the timing, size and duration of the liquidity requirements and the prevailing market conditions.

The Liquidity Plan and the Recovery Plan consider possible constraints on access to each source of liquidity, including whether they would be available during periods of market stress or during a 'liquidity crisis' (a liquidity crisis can reflect market-wide conditions, or be linked to a particular market). LCH.C Ltd incorporates restricted access to liquidity sources in its liquidity stress testing.

Testing

Some of the tools LCH.C Ltd would use to address a liquidity shortfall are applied on an ongoing basis as part of LCH.C Ltd's standard investment and liquidity management activities (e.g. maturing investments, and the purchase and sale of securities). To ensure that it could access liquidity using the tools that are not applied on a day-to-day basis (e.g. repo, borrowing, FX swaps), LCH.C Ltd conducts regular 'war games'. As part of these tests, LCH.C Ltd also simulates the liquidation of a defaulting clearing participant's collateral. These tests are conducted by CaLM quarterly on a rolling basis, so that LCH.C Ltd tests its ability to apply each tool least once a year.

Standard 13: Segregation and Portability

A central counterparty should have rules and procedures that enable the segregation of positions of a participant's customers and the collateral provided to the central counterparty with respect to those positions.

LCH.C Ltd has rules and procedures that enable a clearing participant's customer's positions and collateral to be segregated from those of its clearing participant. LCH.C Ltd also has rules and procedures to enable a clearing participant's customer's positions and collateral to be ported to another clearing participant if its original clearing participant defaulted or was insolvent. The SwapClear service offers a number of account options that provide different combinations of individual and omnibus position accounts and asset segregation (which seeks to protect the clearing participant's customer's specific collateral) and value segregation (which only seeks to protect the value of the clearing participant's customer's collateral).

LCH.C Ltd has arrangements in place to ensure it is highly likely that a defaulting clearing participant's customer's positions and collateral could be ported to another clearing participant. For example: SwapClear knows the identities of its clearing participant's customers; it encourages its clearing participant's customers to nominate a backup clearing participant to which its positions would be offered if its clearing participant defaulted (customers can nominate up to three backup clearing participants); and would provide a clearing participant's customers time to find a backup clearing participant if it did not have one and its clearing participant defaulted or was insolvent.

13.1 A central counterparty should, at a minimum, have segregation and portability arrangements that effectively protect a participant's customers' positions and related collateral from the default or insolvency of that participant. If the central counterparty additionally offers protection of such customer positions and collateral against the concurrent default of the participant and a fellow customer, the central counterparty should take steps to ensure that such protection is effective.

LCH.C Ltd has rules and procedures that are intended to protect a clearing participant's customers' positions and collateral from a default or insolvency of that clearing participant. LCH.C Ltd has informed the Bank that a customer's positions and collateral are segregated from those of its clearing participant at all times. The extent to which SwapClear accounts protect against the concurrent default of the clearing participant and a fellow customer (i.e. from fellow customer risk) depends on the specific SwapClear account type (see Standard 13.2 for a detailed explanation of the alternative account types offered).

13.2 A central counterparty should employ an account structure that enables it readily to identify positions of a participant's customers and to segregate related collateral. A central counterparty should maintain customer positions and collateral in individual customer accounts or in omnibus customer accounts, or equivalent.

LCH.C Ltd has recently changed its account structures in order to comply with EMIR regulations. Under EMIR regulations, CCPs are required to offer customers the option of both individual segregation and omnibus segregation. To meet EMIR requirements, individually segregated accounts must protect each customer's assets using the so-called 'asset segregation' model. Under this model, specific assets lodged as collateral are recorded into each customer's account with its clearing participant. Those specific assets could then potentially be ported to another clearing participant along with the customer's positions in the event of the default of its clearing participant. This contrasts with the so-called 'value segregation' model, under which the value of a non-defaulting customer's lodged collateral is protected, but the customer is not identified with, and therefore is unlikely to have returned to it, the specific assets that it has lodged.

LCH.C Ltd now offers three broad types of customer accounts: an ISA; an OSA using gross margin; and an OSA using net margin.²⁵ The accounts differ in the extent to which each individual customer's positions and collateral are segregated from those of other customers (i.e. the degree of protection from fellow customer risk) and the probability that its positions could be ported. The precise account offering differs across the LCH.C Ltd services, although each service offers an ISA and at least one type of OSA.

The account structure offered by the SwapClear service to customers of clearing participants (i.e. direct customers) is described below. SwapClear clearing participants are free to choose which of these accounts they offer their customers, although they are obliged by EMIR to offer their customers the option of individual and omnibus segregation.

- *Individual segregation.* The ISA is an asset-segregated individual position account. It contains positions of a single legal entity and positions are not exposed to losses from positions outside that particular account (and accordingly are not exposed to fellow customer risk). Initial margin requirements are netted across all positions within the account. Each position account has its own corresponding collateral account (on LCH.C Ltd's books), into which specific cash and non-cash assets lodged in respect of the customer are recorded and which are thereby segregated for that customer's benefit upon its clearing participant's default. In addition, a customer's excess margin is posted to the CCP and segregated from the margin of other customers and clearing participants. If, in the event of a clearing participant default, the positions of each of the defaulting clearing participant's ISA customers needed to be ported to another clearing participant, each customer's specific non-cash collateral assets could be transferred alongside its positions (rather than solely the value of lodged collateral).

²⁵ SwapClear also offers the CFTC-recognised FCM model of clearing participation. Clearing services are offered to customers using the LSOC model. This model seeks to legally segregate customers from other customers, and to ensure that in the event of a default a customer's positions and assets cannot be used to meet the obligations of any other party.

- *Gross omnibus.* The Gross OSA is a value-segregated account. Within the account, customer positions are managed in 'position sets': individual position sets contain positions from a single legal entity, while joint position sets contain positions from multiple legal entities.²⁶ Participation in each joint position set is controlled by the clearing participant or an asset manager with the agreement of a clearing participant. Initial margin is called on a net basis within each position set, but margin obligations are not netted across position sets. A customer with positions in an individual position set is not exposed to other customer's positions. While a customer with positions in a joint position set is exposed to fellow customer risk from other customers' positions within that set, it is not exposed to positions outside the position set in which it resides. Lodged collateral is held on a comingled basis across all position sets. If, in the event of a clearing participant default, the positions of the defaulting clearing participant's Gross OSA customers needed to be ported to another clearing participant, any positions in a joint position set would have to be ported together to the same alternative clearing participant. Individual position sets, on the other hand, may be ported independently.
- *Net omnibus.* The Net OSA is an asset-segregated joint position account. It may contain positions of more than one legal entity. Each clearing participant can have multiple Net OSA accounts, including dedicated accounts for affiliated entities; participation in a Net OSA account is controlled by the clearing participant or an asset manager with the agreement of a clearing participant. Initial margin requirements are netted across all positions within an account. A customer with positions in a Net OSA is exposed to fellow customer risk from the positions of other customers within that Net OSA, but not to any other positions outside that account. Lodged cash and non-cash collateral is segregated in its own collateral account and the specific assets lodged are recorded to the account. Collateral is therefore segregated in collective favour of all customers within that account, rather than in favour of individual customers. In the event of a clearing participant default, all positions in a Net OSA would have to be ported together to the same clearing participant. The specific assets attributed to the customers in the net OSA could be ported alongside those positions (rather than solely the value of lodged collateral).

SwapClear also offers account segregation for indirect customers (i.e. the customers of clearing participants' customers). LCH.C Ltd has informed the Bank that positions of all indirect customers of each direct customer are held in an omnibus sub-account specific to that direct customer. Initial margin is called on a net basis across all the indirect customers' positions in that sub-account.

In order to register trades into the SwapClear Client Clearing Service, the clearing participant or direct customer must provide certain information to SwapClear about the direct customer, such as name of the legal entity, ultimate parent name, country of incorporation, registered address and key contact details. By contrast, SwapClear collects no information on the identity of indirect customers, beyond identification of the direct customer with which they are associated.

SwapClear has arrangements in place that are intended to protect the interests of customers in a default by ensuring it has the right to deal with relevant positions and assets in such a way that recognises the beneficial entitlement of the customer. These arrangements are necessary because positions are entered into, and assets lodged as collateral, by the clearing participant as principal. Absent those arrangements, a defaulting clearing participant's customer's assets could potentially be included as part of the defaulting clearing participant's insolvency estate. SwapClear has informed the Bank that it seeks legal opinions to determine whether the legal jurisdictions of the clearing

²⁶ Although customers holding positions in a joint position set or account are likely to be affiliated in some way, they do not have to be part of the same corporate group or have any other form of relationship. Accordingly, they may not know the identity of other customers with positions in that set or account.

participants that wish to offer customer clearing services have laws that enshrine these arrangements. In cases where this does not exist, the clearing participant is required to enter into a security deed in favour of its customers, which is enforceable in the event of a default of the clearing participant (over the customer's collateral or value of collateral, as appropriate).

Clearing participants must be approved by SwapClear before they are permitted to provide customer clearing services.

The Australian-based clearing participants are currently unable to offer clearing services to their customers but LCH.C Ltd is in discussions with the Bank and ASIC to allow them to do so.

13.3 To the extent reasonably practicable under prevailing law, a central counterparty should structure its portability arrangements in a way that makes it highly likely that the positions and collateral of a defaulting participant's customers will be transferred to one or more other participants.

If a clearing participant defaulted, LCH.C Ltd has arrangements in place to enable that clearing participant's customers' positions, initial margin and record of the cumulative variation margin for those positions since registration to be transferred to another clearing participant. These arrangements would be overseen and implemented by SwapClear Client Services. Customers are encouraged to nominate at least one backup clearing participant to which its positions would be offered if its clearing participant defaulted (customers can nominate up to three backup clearing participants).²⁷ Although backup clearing participants do not guarantee to accept transferred trades, the likelihood of portability is increased because nominated backup clearing participants would have an established relationship with the customer and operational arrangements in place. If a customer's nominated backup clearing participant was also in default, the customer would be given the opportunity to locate another backup clearing participant. LCH.C Ltd's rules do not allow it to close out a customer's positions and collateral until 24 hours after a clearing participant's default (or 12 hours if initial margin had been eroded by 50 per cent or more). This rule is in place to comply with Articles 48(5) and 48(6) of EMIR, which requires CCPs to have a defined period after default before customer positions and collateral can be closed out.

If a clearing participant default occurred, SwapClear Client Services would confirm with each individual customer of the defaulted clearing participant whether it intended to transfer or liquidate its positions. If a customer intended to transfer, SwapClear Client Services would confirm with the customer the identity of its backup clearing participant. SwapClear Client Services would post a suite of reports to the backup clearing participant to enable it to assess the customer's portfolio. These reports would contain position and trade information, initial and variation margin details, sensitivities and valuation of portfolios. The backup clearing participant would have 48 hours after the time of default to consent to the transfer. Positions that were unable to be transferred by that time would be closed out. The likelihood of portability would also be partly contingent on the type of customer account in which the positions and collateral were held. Positions and collateral held in accounts with other customers – that is, a Net OSA or a joint position set within a Gross OSA – could only be ported if all positions of all customers within the account or position set were ported to the same backup clearing participant. If this could not be achieved, positions would be closed out. Portability would be more straightforward for positions and accounts held for a single customer – that is, an ISA or an individual position set within a Gross OSA. LCH.C Ltd publicly discloses aspects of its portability arrangements on its website.

27 Under the FCM model, LCH.C Ltd would seek to – under advice and approval from the CFTC – port the participant's customers to another FCM clearing participant.

LCH.C Ltd delivered the internal technical and functional changes to support portability in March 2014. In addition, portability procedures are tested in SwapClear Fire Drills, which are exercises run by SwapClear every six months for SwapClear and its clearing participants to practise aspects of the default management processes.

SwapClear also supports the ability of customers to port positions as part of ordinary, non-default operations. SwapClear aims to complete porting requests within two days; for this to occur the request must be received by LCH.C Ltd by 17:00 London time on day 0. Requests are initiated by the clearing participant receiving the positions (the receiving clearing participant) and made to SwapClear Client Services. The request must designate the positions to be transferred, noting whether collateral will be transferred and providing evidence that the request has been made on behalf of the customer. The receiving clearing participant is required to approve the transfer of positions and collateral by 17:00 London time on day 2. If approval is not given by that time, the transfers will be rejected. A clearing participant has no powers to prevent a customer of good standing from transferring its positions to another clearing participant. There are, however, provisions to prevent a customer that is in breach of its financial obligations to the clearing participant, or that is insolvent or bankrupt, from transferring its positions.

Standard 14: General Business Risk

A central counterparty should identify, monitor and manage its general business risk and hold, or demonstrate that it has legally certain access to, sufficient liquid net assets funded by equity to cover potential general business losses so that it can continue operations and services as a going concern if those losses materialise. Further, liquid net assets should at all times be sufficient to ensure a recovery or orderly wind-down of critical operations and services.

LCH.C Ltd has sufficient liquid net assets funded by equity to implement its Recovery Plan and Wind-down Plan. It has funds set aside to cover risks including operational and legal risk, uncovered credit, counterparty credit and market risks, and business risks, as well as the implementation of its Recovery and Wind-down Plans. LCH.C Ltd's capital is invested in accordance with the LCH.C Group's investment and liquidity policies.

14.3 A central counterparty should maintain a viable recovery or orderly wind-down plan and should hold, or have legally certain access to, sufficient liquid net assets funded by equity to implement this plan. At a minimum, a central counterparty should hold, or have legally certain access to, liquid net assets funded by equity equal to at least six months of current operating expenses. These assets are in addition to resources held to cover participant defaults or other risks covered under CCP Standard 4 on credit risk and CCP Standard 7 on liquidity risk. However, equity held under international risk-based capital standards can be included where relevant and appropriate to avoid duplicate capital requirements.

As at 30 June 2014, LCH.C Ltd had share capital and audited reserves of €439 million. Of that, LCH.C Ltd has allocated capital to cover a range of risks including operational and legal risk, uncovered credit, counterparty credit and market risk, business risks, and to implement its Recovery and Wind-down Plans. The allocated capital cannot be used for any other purpose. The minimum capital requirement and the amount of available capital are recalculated daily.

LCH.C Ltd's capital is invested in accordance with the LCH.C Group's investment and liquidity policies. At least 95 per cent of LCH.C Ltd's cash invested with counterparties on average each month must be secured by highly marketable securities. All sovereign, explicitly guaranteed or supranational security

purchases must be eligible for repo with the relevant central bank or a commercial counterparty. Collateral received using reverse repo transactions (i.e. in which LCH.C Group is the cash lender) is also subject to haircuts and concentration limits.

Standard 16: Operational Risk

A central counterparty should identify the plausible sources of operational risk, both internal and external, and mitigate their impact through the use of appropriate systems, policies, procedures and controls. Systems should be designed to ensure a high degree of security and operational reliability and should have adequate, scalable capacity. Business continuity management should aim for timely recovery of operations and fulfilment of the central counterparty's obligations, including in the event of a wide-scale or major disruption.

LCH.C Ltd is a UK-based facility and any crisis management actions would be expected to be led by the UK resolution authority, the BoE. It is expected that these arrangements will be considered further with the BoE and other regulators over coming months. Nonetheless, LCH.C Ltd's CMT Plan does consider crisis management for LCH.C Ltd's outsourced IT arrangements with Tata Consultancy Services (TCS), which is considered to be a critical service provider.

Business continuity

LCH.C Ltd's approach to business continuity is set out in the Group Business Continuity Management Policy. That document makes reference to several other documents that outline procedures for ensuring continuity of service in a crisis. These documents are the CMT Plan, the Major Incident Management Process and the IT Disaster Recovery Plan. The Group Business Continuity Management Policy, CMT Plan and the Major Incident Management Process are LCH Group documents; the IT Disaster Recovery Plan is an LCH.C Ltd policy, although it also covers production services provided by LCH.C Ltd to LCH.Clearnet SA (LCH.C SA) and LCH.C LLC.

The CMT Plan provides detailed information about how the CMT process would be activated across the entire LCH.C Group, which includes LCH.C Ltd, LCH.C SA and LCH.C LLC. There are detailed sections about CMT members and their alternates, their roles and responsibilities and their contact information. The plan contains a checklist of required actions needed to assess, react to, manage and recover from an incident. Incidents would be managed by the Local CMT in London, Paris or New York, but would be escalated to the CMT if they could not be managed at the local level (e.g. if there was a city-wide metropolitan crisis, a pandemic or a crisis affecting more than one location).

The Major Incident Management Process categorises incidents according to one of five levels of severity and sets out how they should be resolved:

- A Priority 1 incident is one that prevent LCH.C Group CCPs fulfilling their financial, legal or regulatory obligations or causes widespread unavailability of critical business services to all participants or partners.
- A Priority 2 incident is one that affects LCH.C Group CCPs from fulfilling their financial, legal or regulatory obligations or causes limited availability of critical business services to multiple participants or partners.
- A Priority 3C incident is one that affects LCH.C Group CCPs' service (and unless resolved will become a Priority 2 incident) or causes limited availability of non-critical business services to a small number of participants or partners.

- A Priority 3 incident is one that affects LCH.C Group CCPs' service or causes limited availability of non-critical business services to a small number of participants or partners.
- A Priority 4 incident is one that is minor, falls outside the other categories and has only an internal effect.

The Incident Handling Team, which would comprise the Service Desk and IT Production Operations, would be responsible for the immediate handling of an incident. Incidents categorised as Priority 1 or 2 would be escalated to the Duty Production Manager. The Duty Production Manager would be responsible for the technical resolution of an incident and for coordinating escalation to the CMT. The CMT would be invoked for all Priority 1 incidents and notified of all Priority 2 incidents. Priority 1 incidents should be responded to within five minutes and resolved within 60 minutes. Priority 2 incidents should be responded to within ten minutes and resolved within 90 minutes.

The IT Disaster Recovery Plan provides business continuity and disaster recovery plans for IT services. LCH.C Ltd has the objective of recovering its core clearing services within two hours of the point of failure and must be able to perform end-of-day settlement of transactions on the same business day. It also has the objective of completely recovering its data should its critical IT systems fail.

LCH.C Ltd's recovery time objectives are supported by maintenance of three geographically separate data centres. Two of these centres are connected with synchronous data replication. This means that data are posted to both sites at the same time so that data remain current at both sites. The third data centre uses asynchronous data replication, which means that data would need to be transferred to it before production services could be run. This data centre was subject to extensive testing in 2013 and recovery was achieved within two hours. A partial recovery test between the two other sites was completed in early 2014. A full test between these sites is to be scheduled.

The CMT plan and the IT Disaster Recovery Plan are reviewed at least annually and following the introduction of new services, major incidents, identification of new risks, organisational changes and major changes to the technical infrastructure. The CMT plan is signed off by the CMT Group Governance members and the IT Disaster Recovery Plan is signed off by LCH.C Ltd's Audit Committee and Board.

16.11 A central counterparty should organise its operations, including any outsourcing or critical service provision arrangements, in such a way as to ensure continuity of service in a crisis and to facilitate effective crisis management actions by the Reserve Bank or other relevant authorities. These arrangements should be commensurate with the nature and scale of the central counterparty's operations.

Since LCH.C Ltd is a UK-based CS facility, any crisis management actions would be expected to be led by the UK resolution authority, the BoE. Legislation establishing a resolution regime for UK CCPs received royal assent in December 2012, although the relevant legislative provisions are not yet in force and the UK authorities are developing supporting secondary legislation that will establish the date on which the resolution regime for CCPs will become effective. The crisis management arrangements that would apply to LCH.C Ltd have important implications for all jurisdictions in which LCH.C Ltd operates, including for Australia, and it is intended that LCH.C Ltd's crisis management will be considered further in conjunction with the BoE and other regulators over coming months. In addition, LCH.C Ltd's crisis management arrangements form part of the Bank's regulatory priorities for LCH.C Ltd.

The CMT Plan considers crisis management arrangements for outsourced IT functions. The Plan specifically covers LCH.C Ltd's arrangement with TCS, which is considered to be a critical service

provider. TCS provides IT production services (to enable LCH.C Ltd to offer 24 hour coverage), IT support and IT development resources, including testing, from its site in Bangalore. LCH.C Ltd remains accountable for IT production, including overall management control. TCS has an alternative site in Bangalore that could be used if its primary site was affected. In the case of a Bangalore-wide event, LCH.C Ltd and TCS have a contingency strategy for critical services to be provided by London. LCH.C Ltd's Master Service Agreement with TCS ensures that LCH.C Ltd and its regulators have access to TCS's facilities, personnel and records. LCH.C Ltd may need to consider how relevant authorities could take effective crisis management actions to ensure that TCS was able to provide continuous reliable service in a crisis, as part of its resolution planning in the coming period. The Bank will engage further with LCH.C Ltd and the BoE on this matter.

Abbreviations

ALCo	Asset and Liquidity Committee	FSS	Financial Stability Standards
AMUG	Australian Member User Group	FX	foreign exchange
ASIC	Australian Securities and Investments Commission	ICS	internal credit score
BoE	Bank of England	IOSCO	International Organization of Securities Commissions
CaLM	Collateral and Liquidity Management	IRD	interest rate derivative
CaLRM	Collateral and Liquidity Risk Management	ISA	individually segregated account
CBA	Commonwealth Bank	IT	information technology
CCP	central counterparty	LCH.C Group	LCH.Clearnet Group Ltd
CCP Standards	Financial Stability Standards for Central Counterparties	LCH.C LLC	LCH.Clearnet LLC
CEO	Chief Executive Officer	LCH.C Ltd	LCH.Clearnet Ltd
CFR	Council of Financial Regulators	LCH.C SA	LCH.Clearnet SA
CFTC	Commodity Futures Trading Commission	LCR	liquidity coverage ratio
CMT	Crisis Management Team	LME	London Metal Exchange
COO	Chief Operating Officer	LSOC	legally separated operationally comingled
CPSS	Committee on Payment and Settlement Systems	MRMC	Market Risk Management Committee
CRO	Chief Risk Officer	MWG	Model Working Group
CS	clearing and settlement	NAB	National Australia Bank
DFAM	default fund additional margin	NCA	national competent authority
EMIR	<i>Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories</i>	OSA	omnibus segregated account
ERCo	Executive Risk Committee	OTC	over-the-counter
ESA	Exchange Settlement Account	PAIRS	Portfolio Approach to Interest Rate Scenarios
EU	European Union	PPS	Protected Payments System
FCM	Futures Commission Merchant	RRP	Recovery and Resolution Plan Programme
FEX	Financial and Energy Exchange	STLOIM	stress-test loss over initial margin
FMI	financial market infrastructure	SWIFT	Society for Worldwide Interbank Financial Telecommunication
FSMA	<i>Financial Services and Markets Act 2000</i>	TCS	Tata Consultancy Services Limited