

2014/15 Assessment of LCH.Clearnet Limited's SwapClear Service

December 2015

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ISSN 2204-3152 (Online)

1. Introduction and Executive Summary

In accordance with its responsibilities under the *Corporations Act 2001* (the Corporations Act), 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 is obliged under the Corporations Act to report its findings to the relevant Minister and the Australian Securities and Investments Commission (ASIC). Consistent with established policy, Assessment reports are also 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 counterparty (CCP) services 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, to be operated by FEX Global Pty Ltd. This licence was varied in July 2013 to permit LCH.C Ltd to offer its SwapClear service, and again in July 2015 to permit SwapClear to offer clearing services for inflation rate derivatives to its Australian clearing participants. This report presents the Bank's Assessment of SwapClear for the 15 months ending 30 September 2015, with a particular focus on its services to Australian participants. The FEX market is not yet operational.

The Bank has reviewed LCH.C Ltd's observance of the requirements under all relevant *Financial Stability Standards for Central Counterparties* (CCP Standards). The CCP Standards are aligned with the Principles in the *Principles for Financial Market Infrastructures* (the Principles), developed by the Committee on Payments and Market Infrastructures (CPMI) and the Technical Committee of the International Organization of Securities Commissions (IOSCO), that address matters relevant to financial stability.²

In contrast to its practice for domestically licensed CS facilities, the Bank has not presented a formal rating of the level of LCH.C Ltd's observance of each high-level standard in the CCP Standards. 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 may place conditional reliance on reports and information from LCH.C Ltd's primary regulator, the BoE.³ Nonetheless, a full evidence base for each applicable CCP Standard is reported.

1 Until June 2013, the Bank was obliged to carry out such assessments annually. A legislative amendment at that time restricted 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 As of 1 September 2014, the mandate and charter of the Committee on Payment and Settlement Systems have been refreshed and the Committee has been renamed. It is now known as the Committee on Payments and Market Infrastructures.

3 The Bank has clarified in a guidance note, 'The Reserve Bank's Approach to Assessing Clearing and Settlement Facility Licensees', that it may place reliance on an overseas regulator in respect of FSS for which a 'materially

Furthermore, based on its Assessments, the Bank's practice is 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 including those specific to LCH.C Ltd's provision of services to the Australian market. The Bank may also set regulatory priorities: to signal matters on which it intends to engage in further discussions with LCH.C Ltd; or to identify emerging risks or issues that are relevant across all of the CCPs the Bank supervises.

LCH.C Ltd has either met or made progress towards meeting the regulatory priorities identified by the Bank in its 2013/14 Assessment of LCH.C Ltd's SwapClear Service. The Bank therefore concludes that LCH.C Ltd has conducted its affairs in a manner that causes, or promotes, overall stability in the Australian financial system.

1.1 Overview of Activity in LCH.Clearnet Limited's SwapClear Service

SwapClear clears six types of over-the-counter (OTC) interest rate derivatives (IRDs): interest rate swaps; zero-coupon swaps; basis swaps; forward rate agreements; overnight index swaps (OISs); and variable notional swaps. In April 2015, SwapClear also began to clear inflation swaps. SwapClear clears IRDs in 17 currencies, although the vast majority of its activity is in IRDs denominated in EUR, USD and GBP. There has been a notable decline in total notional value outstanding in the SwapClear service since late 2014. This largely reflects trade compression activity, without which notional value outstanding would have increased.

The four major Australian banks have now joined SwapClear as clearing participants. Of those, two joined during the Assessment period. Over the Assessment period, the four major banks cleared a greater proportion of their activity as direct participants, although some continue to clear trades in certain currencies as clients of other direct clearing participants. The total notional value outstanding of the Australian banks across all currencies has increased strongly over recent years.

During the Assessment period, the SwapClear service experienced a number of operational incidents that were classified by LCH.C Ltd as having a severe or major impact. Many of these incidents resulted in the delayed opening of the SwapClear service. LCH.C Ltd targets information technology (IT) system availability for the SwapClear service equivalent to at least 99.71 per cent. During the Assessment period, SwapClear met this target in 10 of the 15 months, and IT system availability averaged over the period was 99.62 per cent. LCH.C Ltd targets a maximum capacity utilisation of 50 per cent for the SwapClear service and this target was met in each month over the period.

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. Information received through participation in any cooperative oversight arrangement may also be taken into account – in the case of LCH.C Ltd, the BoE has established multilateral oversight college arrangements for LCH.C Ltd, in which the Bank participates. To date, the Bank has relied to only a limited extent on the BoE, but expects to do so more in the future. The guidance note is available at <<http://www.rba.gov.au/payments-system/clearing-settlement/standards/assess-csf-licensees.html>>.

1.2 Review of Regulatory Priorities

A focus of the Bank's oversight over the 2014/15 Assessment period has been LCH.C Ltd's progress towards meeting the regulatory priorities the Bank identified in its 2013/14 Assessment of LCH.C Ltd's SwapClear Service. The majority of these priorities reflect the Bank's view that LCH.C Ltd's operational and governance arrangements should promote stability in the Australian financial system, given SwapClear's systemic importance in Australia. Specifically, the Bank expected LCH.C Ltd to:

- continue its work to extend operating hours and operational support in the Australian time zone
- open an Exchange Settlement Account (ESA) and develop and implement arrangements for settling AUD obligations through its ESA
- develop and implement arrangements to manage its AUD liquidity risk, utilising its ESA
- consider accepting AUD cash as initial margin
- ensure its crisis management arrangements take appropriate account of Australian stability interests.

The Bank set a further priority that LCH.C Ltd should demonstrate the adequacy of its liquidity stress-testing arrangements.

LCH.C Ltd made good progress towards meeting these priorities over the Assessment period and has fully met the Bank's priorities on liquidity risk and its crisis management arrangements. In addition, LCH.C Ltd has met the Bank's priority that it consider accepting AUD cash as initial margin. LCH.C Ltd's proposal to accept AUD cash as initial margin has been approved by its internal risk governance processes and LCH.C Ltd is now seeking regulatory approval for the proposal. The Bank has set a regulatory priority for 2015/16 requiring that LCH.C Ltd proceed with its plans to accept AUD cash as collateral, subject to regulatory approval.

The Bank's assessment is that LCH.C Ltd has partly met its priority regarding the extension of operating hours and operational support in the Australian time zone. Although the operating hours of the SwapClear service were extended slightly in late 2014, LCH.C Ltd has put its project to extend the operating hours further on hold while it seeks to enhance its operational resilience and operational risk management. LCH.C Ltd has discussed with the Bank a number of options for extending the operating hours of the service and the Bank will continue to engage with LCH.C Ltd over the period regarding these proposals. The Bank has emphasised to LCH.C Ltd that, although this remains a priority, the Bank expects any changes to be implemented in a way that maintains the safety and resilience of the CCP.

The Bank considers that LCH.C Ltd has now fully met the requirement to have sufficient operational support in the Australian time zone. LCH.C Ltd met this requirement by increasing the number of staff in its Sydney office over the period.

LCH.C Ltd has also partly met the Bank's priority that it open an ESA, and develop and implement arrangements for settling AUD obligations through its ESA. LCH.C Ltd was granted an ESA in late 2014, and began using it to effect its AUD concentration payments (i.e. settlement of AUD obligations between LCH.C Ltd and its settlement banks) in late March 2015. To facilitate payments to and from its clearing participants, LCH.C Ltd operates a payment system known as the Protected Payment System (PPS). LCH.C Ltd is currently in the process of completing the implementation of an Australian PPS. The Bank has set LCH.C Ltd a regulatory priority for 2015/16 to complete the implementation of its PPS arrangements in Australia.

1.3 Other Material Developments and Regulatory Priorities

In addition to the changes implemented in response to the priorities arising from the Bank's 2013/14 Assessment, there were a number of additional material developments during the period.

Operational risk

During the Assessment period, the SwapClear service experienced a number of operational incidents that were classified by LCH.C Ltd as having a severe or major impact. Many of these incidents resulted in the delayed opening of the SwapClear service. LCH.C Ltd has carried out an extensive program of work throughout the Assessment period as it seeks to enhance its resilience to operational risk. This program, which continues work begun during the 2013/14 period, has included changes to LCH.C Ltd's governance of operational risk, and the implementation of a number of changes to internal controls in areas such as change management and incident handling. The Bank has set a regulatory priority for 2015/16 for LCH.C Ltd to continue to work to enhance its operational resilience and operational risk management, and continue to implement recommendations arising from recent internal and external operational risk reviews. The Bank will engage actively with the BoE on this priority.

The Bank has also set a regulatory priority for 2015/16 for LCH.C Ltd to continue its dialogue with the Bank on its cyber risk management arrangements and to review its cyber risk management arrangements in light of forthcoming CPMI-IOSCO guidance.⁴ The Bank will also engage actively with the BoE on this priority.

Client clearing

When LCH.C Ltd's CS facility licence was varied to allow it to offer the SwapClear service in Australia, LCH.C Ltd agreed that it would not permit Australian clearing participants to offer client clearing services until the Bank and ASIC had conducted further due diligence. This work has been finalised and Australian clearing participants are now able to offer client clearing services, subject to internal risk governance approval from LCH.C Ltd. This has been granted to one Australian clearing participant, which began client clearing in November 2015. The Bank has set a regulatory priority for 2015/16 that it expects to continue its dialogue with LCH.C Ltd on its broader client clearing arrangements.

Resolution

As a UK-based CCP, any resolution of LCH.C Ltd would be governed by English law. In March 2015, the UK Treasury issued updated guidance as to how and in what circumstances the authorities will use the special resolution tools. The BoE is the resolution authority for UK CCPs. The European Commission (EC) is expected to submit a legislative proposal on CCP recovery and resolution, possibly extending to other financial market infrastructures (FMIs), in the coming period (see Section 3.5.3). In 2015, the BoE established a crisis management group (CMG) for LCH.C Ltd, of which the Bank is a member. The CMG will discuss and facilitate development of the resolution plan for LCH.C Ltd, taking into account the cross-border nature of LCH.C Ltd's business. The CMG met for the first time in October 2015.

⁴ CPMI-IOSCO released a consultative document with respect to this guidance in late November, available at <<http://www.bis.org/cpmi/publ/d138.htm>>.

Credit risk

The Bank has set two regulatory priorities for 2015/16 for LCH.C Ltd related to credit risk. One priority is for LCH.C Ltd, as part of its broader work towards making changes to its Recovery Plan to reflect CPMI-IOSCO guidance, to continue its dialogue with the Bank on its arrangements for replenishing the default fund after the default of a SwapClear clearing participant. SwapClear calibrates the size of its financial resources to cover its largest potential credit exposure to any two participants and their affiliates in the extreme but plausible scenarios covered in its stress tests (the so-called 'cover two' requirement), consistent with obligations for a facility that is systemically important in multiple jurisdictions. SwapClear would return to cover two immediately using a combination of mutualised resources and calls for additional margin, and the Bank will continue its discussion with LCH.C Ltd about whether SwapClear's plans provide an appropriate balance between clearing participants' preferences to minimise mutualisation following a major default and the potential (market-wide) procyclical liquidity impact of relying on calls for additional margin to achieve cover two. The other priority is for LCH.C Ltd to continue to review its interpretation of 'extreme but plausible' market conditions with respect to stress testing and to review its arrangements in light of forthcoming international guidance.

Disclosure

The Bank has set a regulatory priority for 2015/16 for LCH.C Ltd to proceed with its plans to publish risk and activity data in line with international guidance. The Bank will also discuss further with LCH.C Ltd the level of disclosures it makes to its clearing participants with respect to loss allocation tools.

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, risk management and operational performance of the SwapClear service. Appendix A summarises LCH.C Ltd's governance arrangements, and Appendix B concludes with the Bank's detailed assessment of LCH.C Ltd's SwapClear service against all the CCP sub-standards.

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.

2. Summary of Regulatory Priorities

This section summarises actions taken by LCH.C Ltd over 2014/15 to meet the Bank's regulatory priorities identified in the 2013/14 Assessment, and summarises the priorities identified by the Bank in its 2014/15 Assessment of LCH.C Ltd's SwapClear Service against the CCP Standards.

2.1 Progress against 2014/15 Regulatory Priorities

The Bank's 2013/14 Assessment of LCH.C Ltd's SwapClear Service set out a number of priorities for LCH.C Ltd. The majority of the Bank's 2014/15 regulatory priorities reflected the Bank's view that LCH.C Ltd's operational and governance arrangements should promote stability in the Australian financial system, given SwapClear's systemic importance in Australia. LCH.C Ltd's actions to meet these regulatory priorities are summarised in Table 1 and are discussed in more detail in Section 3.6.

Table 1: LCH.C Ltd Regulatory Priorities for 2014/15

| Standard | Priority | 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 to the Australian time zone. | Partly addressed. Expected to be fully addressed over the next few years. In late October 2014, LCH.C Ltd brought forward the opening time of the SwapClear service to 5.00 am UK time, from 7.30 am. This reduced the amount of time the service was closed from 7.5 to 5 hours. However, the SwapClear service was affected by various operational incidents, which caused the service to open late on four days in November. Consequently, in early December, LCH.C Ltd moved the opening time to 6.00 am. LCH.C Ltd made a number of system changes to its start-of-day and end-of-day processes in October 2015 and is considering whether it can extend its operating hours. LCH.C Ltd is scheduled to make additional system changes in 2016. LCH.C Ltd has met the requirement to extend operational support in the Australian time zone. |
| 9. Money settlements | 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. | Partly addressed. LCH.C Ltd was granted an ESA in late 2014 and, since early 2015, has been using it to settle its AUD obligations. LCH.C Ltd is currently working to complete the implementation of its Australian PPS arrangements. |

| Standard | Priority | Comment |
|--|---|---|
| 7. Liquidity risk | LCH.C Ltd should develop and implement arrangements to manage its liquidity risk, utilising its ESA. | <p>Fully addressed.</p> <p>During the period, LCH.C Ltd became a participant of Austraclear and established holdings of sufficient (Bank-eligible) AUD-denominated debt securities to cover its estimated AUD liquidity needs in the event of the default of the two clearing participants and their affiliates with the largest AUD obligations in 'stressed' market conditions. In the event that LCH.C Ltd needed to access AUD liquidity it would, in the first instance, seek to repo this collateral with market counterparts, before seeking liquidity from the Bank on an overnight basis. LCH.C Ltd could raise additional liquidity beyond that which it could access from its holdings of AUD-denominated debt securities by entering into foreign exchange swaps with market participants.</p> <p>LCH.C Ltd intends to hire an additional member of staff for its Sydney office to ensure that it can access same-day AUD liquidity from market counterparts.</p> |
| 5. Collateral | LCH.C Ltd should consider accepting Australian dollar cash as initial margin. | <p>Fully addressed.</p> <p>LCH.C Ltd has considered accepting AUD cash as initial margin. A proposal to do so has been approved under LCH.C Ltd's internal governance processes. LCH.C Ltd is now engaging with regulators on the proposal.</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>Fully addressed.</p> <p>LCH.C Ltd has demonstrated that its crisis management arrangements take appropriate account of Australian stability interests. In particular, SwapClear included an AUD-denominated portfolio in its February 2015 fire drill. This tested the ability of the SwapClear Default Management Group (DMG) and participants with AUD-denominated portfolios to respectively hedge, and value and bid on an AUD-denominated portfolio. SwapClear would be able to second a trader with specific experience in AUD-denominated swaps if it considered that to be necessary, and the auction of the AUD-denominated portfolio would be held when the Australian market was open. The Bank expects to periodically engage with LCH.C Ltd regarding these arrangements.</p> <p>During the period, the BoE established a CMG for LCH.C Ltd, of which the Bank is a member. The CMG will be responsible for establishing a resolution plan for LCH.C Ltd that takes account of the cross-border nature of LCH.C Ltd's business.</p> |
| <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>Fully addressed.</p> <p>The Bank has reviewed LCH.C Ltd's liquidity reverse stress-testing results. These results indicate that LCH.C Ltd has access to a significant amount of liquidity in excess of its expected needs, even in extreme but plausible scenarios. For each quarter, LCH.C Ltd concluded that it would be implausible for a liquidity deficit to be generated as a result of increases in variation margin outflows.</p> |

2.2 2015/16 Regulatory Priorities

The Bank's regulatory priorities for LCH.C Ltd for 2015/16 are summarised in Table 2. Three of these priorities relate to LCH.C Ltd's provision of the SwapClear service to the Australian market. These have effectively been carried over from the previous Assessment period. The Bank expects LCH.C Ltd to

complete its work on these priorities to ensure that its operations appropriately promote financial stability in the Australian financial system.

The Bank's other regulatory priorities apply to LCH.C Ltd's provision of the SwapClear service more generally. As discussed in Section 1, the Bank has not formally 'rated' the level of LCH.C Ltd's observance against each of the CCP Standards. The Bank has nevertheless described how LCH.C Ltd observes each sub-standard and identified regulatory priorities where: it expects LCH.C Ltd to conduct additional work to enhance its observance of the requirements under particular standards; it seeks to continue ongoing discussions with LCH.C Ltd; or it considers there to be emerging risks or issues that are relevant across all the CCPs the Bank supervises. The regulatory priorities in the table are discussed in more detail in Section 3.6 and in Appendix B.

Table 2: LCH.C Ltd Regulatory Priorities for 2015/16

| Standard | Priority |
|---|---|
| <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 the operating hours of the SwapClear service, while ensuring the safety and resilience of its operations. |
| 9. Money settlements | LCH.C Ltd should complete its implementation of PPS arrangements in Australia. |
| 5. Collateral | LCH.C Ltd should proceed with its plans to accept Australian dollar cash as initial margin, subject to approval by the relevant regulators. |
| <i>Other Regulatory Priorities</i> | |
| 16. Operational risk | LCH.C Ltd should continue work to enhance its operational resilience and operational risk management. LCH.C Ltd should continue to implement recommendations arising from recent internal and external operational risk reviews. |
| | The BoE has also identified operational risk as a supervisory priority across all of the FMI's it supervises. The Bank therefore expects to engage actively with the BoE on this priority. |
| 16. Operational risk | LCH.C Ltd is encouraged to continue its dialogue with the Bank on its cyber risk management arrangements. LCH.C Ltd is also encouraged to review its cyber risk management arrangements in light of forthcoming CPMI-IOSCO guidance on cyber resilience for FMI's. |
| | The BoE has also identified cyber risk as a supervisory priority across all the FMI's it supervises. The Bank therefore expects to engage actively with the BoE on this priority. |
| 4. Credit risk | LCH.C Ltd is encouraged to continue to review its interpretation of 'extreme but plausible' market conditions in designing its stress-test scenarios. This work should be undertaken in light of evolving international best practice, including outcomes of CPMI-IOSCO work on stress testing. |
| 4. Credit risk | LCH.C Ltd is encouraged to continue its dialogue with the Bank about its arrangements to replenish the SwapClear default fund in the event of a drawdown following the default of a SwapClear clearing participant. LCH.C Ltd should demonstrate that its current arrangements for returning to the full level of cover required under CCP Standard 4.4 minimise the potential for procyclicality, to the extent practicable and prudent. |
| 13. Segregation and portability 18. Tiered participation arrangements | LCH.C Ltd began to implement client clearing in Australia in November 2015. LCH.C Ltd is encouraged to continue its dialogue with the Bank on its broader client clearing arrangements, including its approach to monitoring risks from tiered participation and its ongoing testing and review of arrangements to support the porting of client positions in the event of a participant default. |
| 20. Disclosure of rules, key policies and procedures, and market data 4. Credit risk 15. Custody and investment risks | LCH.C Ltd should carry out its plans to regularly publish risk and activity data in accordance with the CPMI-IOSCO quantitative disclosure standards for CCPs. In addition, the Bank will discuss with LCH.C Ltd the development of additional disclosures to assist participants in understanding their contingent exposure to the use of loss allocation tools. The Bank will also discuss with LCH.C Ltd the adequacy of its disclosure of investment risks to participants in light of its arrangements to allocate investment losses in excess of €15 million to participants. |

3. Assessment of LCH.Clearnet Limited's SwapClear Service 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. This is commonly achieved by the CCP 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 arising from its operations 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 period from 1 July 2014 to 30 September 2015. The Bank's Assessment in this period covers LCH.C Ltd's observance of all the requirements under the CCP Standards.

3.2 Activity in SwapClear

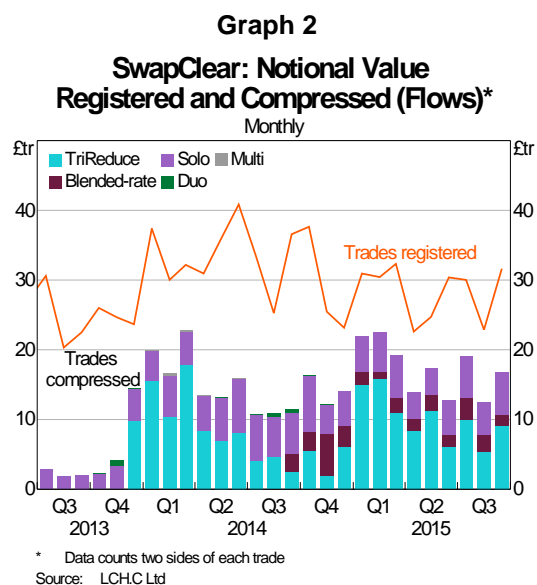
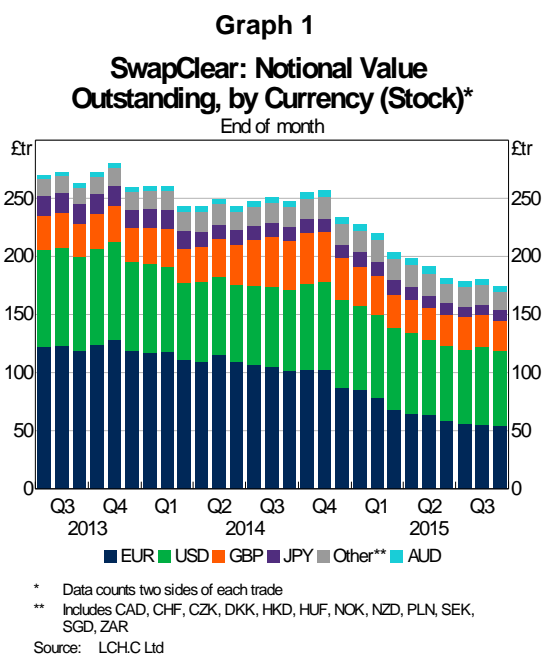
3.2.1 Global activity in SwapClear

SwapClear clears a variety of OTC IRD types in 17 different currencies, and has participants 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 the end of September 2015, around 31 per cent was denominated

in EUR, 37 per cent in USD, 14 per cent in GBP and 17 per cent in other currencies. Around 3 per cent was in AUD.

The recent decline in notional value outstanding, visible in Graph 1, largely reflects trade compression activity. Without compression, SwapClear’s notional value outstanding would have grown by around £158 trillion. Since July 2014, a total of around £232 trillion of notional value has been compressed; the amount compressed each month has varied between £10 trillion and £23 trillion (Graph 2).⁵ See ‘Box A: Compression’ for further discussion of the types of compression that SwapClear offers.



5 This figure counts two sides of each centrally cleared trade.

Box A: Compression

Trade compression, or tear-up, refers to the termination of trades with offsetting cash flows to reduce notional value outstanding while leaving market risk unchanged (or, for certain types of compression, within a predefined tolerance range). Since July 2014, a total of around £232 trillion of notional value has been compressed. SwapClear offers three types of proprietary compression to its clearing participants and their clients: solo; duo; and multilateral. SwapClear also supports 'triReduce' dealer compression conducted by TriOptima. These are discussed further below.

Benefits of compression

Compression offers benefits for clearing participants and clients subject to regulatory minimum capital requirements. Compression may reduce the level of capital that a bank must hold to meet leverage ratio requirements that are driven by the gross exposures of their portfolio. This has been a key driver of interest in compression by clearing participants and clients of clearing participants. Compression also offers business-as-usual operational efficiencies to a clearing participant or client by reducing the number of trades in its portfolio.

Compression may also aid the implementation of SwapClear's default management process (DMP) by reducing the number of outstanding trades. In the event of a clearing participant default, SwapClear would become exposed to the market risk on the defaulter's portfolio. SwapClear would respond by hedging most of the defaulter's market risk and auctioning the defaulter's portfolio in packages, together with any hedges. Compression makes it easier for surviving clearing participants to bid in the auction, as it is operationally less difficult to value portfolios with a smaller number of trades. Similarly, compression of client accounts also makes it easier for surviving participants to assess the market risk arising from the portfolios of the defaulting participant's clients. This may facilitate the porting of clients' positions.

Solo compression

Solo compression is an automatic daily process that tears up a participant's or client's own offsetting OTC IRD trades, irrespective of the counterparty to each trade. This process must leave the market risk on the portfolio exactly unchanged. This process requires that trades are unlinked, so that compression can take place on one side of the trade without affecting the other.

The scope for solo compression was substantially increased by changes to SwapClear's method of booking trades in late 2014. Previously, SwapClear booked some trades using a 'linked model', under which a single record is kept covering the two sides to a given trade, and other trades using an 'unlinked model', under which a separate record is kept on each side of the trade. SwapClear now books all new and existing trades with the unlinked model, such that when two clearing participants submit a given trade to the CCP, two equal and opposite trades vis-a-vis the CCP result. SwapClear began de-linking existing trades in the material currencies in late 2014, and announced in January 2015 that it had de-linked existing trades in all currencies.

Extensions of solo compression

The set of trades eligible for compression has been increased by the introduction of future cash flow netting and blended rate solo compression. Future cash flow netting allows for the compression of trades with different start dates, but the same fixed rates and future cash flow dates. Blended rate solo compression relaxes the requirement for trades to have the same fixed rates. However, the trades that are offset must have the same remaining cash flow dates and the resultant trades have

the same cash flow as the pre-compression net cash flows. SwapClear runs solo compression with blended rate compression twice a week.

Duo and multilateral compression

In duo and multilateral compression, two or more clearing participants cooperate to compress offsetting portfolios. The participants can replace the portfolios with a smaller number of 'risk replacement' trades if they choose. Participants must submit a compression proposal to SwapClear, identifying trades to tear up and any replacement trades. SwapClear then implements the proposal. Unlike solo compression, small changes in market risk are allowed within a tolerance defined by the participants. This risk tolerance expands the set of trades that can be compressed. The change in each participant's market risk will be exactly offset by the change in market risk of the other participants, and therefore SwapClear continues to maintain a balanced book.

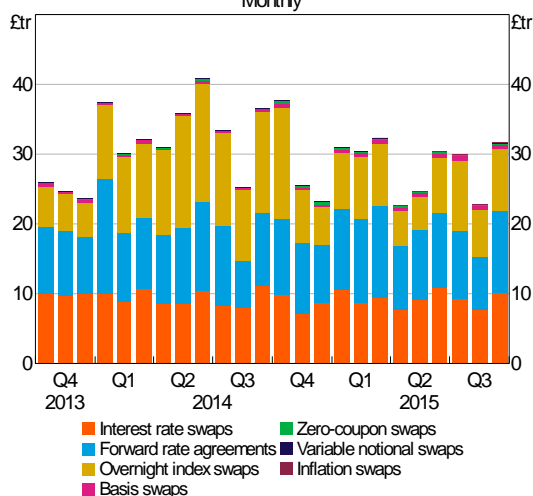
To execute duo and multilateral compression, SwapClear previously relied on the linking of trades to identify the counterparties to each trade. SwapClear began offering duo and multilateral compression for unlinked trades in December 2014 in line with the migration to the unlinked model. SwapClear's multilateral and duo compression are now scheduled based on members' demand to use such services.

TriOptima compression

SwapClear allows multilateral compression runs to be facilitated by third parties. As at the end of September 2015, TriOptima was the only third party allowed by SwapClear to facilitate these runs, which it offers through the 'triReduce' service. As with SwapClear's proprietary multilateral compression, TriOptima's multilateral compression allows changes to market risk within tolerances. The participants involved in the compression run submit trades they would like compressed to TriOptima and state their tolerance for changes in risk. TriOptima then draws up a compression proposal that the participants can either accept or reject. This process ensures an effective method of reaching acceptance of the proposal compared to member-driven multilateral compressions. This proposal is then implemented by SwapClear in the same way as it would implement a proprietary multilateral compression run.

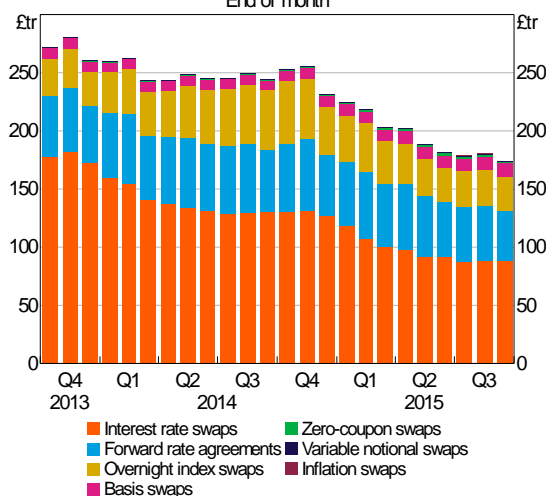
SwapClear clears six types of IRD product: interest rate swaps; zero-coupon swaps; basis swaps; forward rate agreements; OISs; and variable notional swaps. In March 2015, SwapClear began to clear inflation swaps. Graph 3 and Graph 4 depict notional value registered and notional value outstanding at SwapClear, 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 OIS and forward rate agreements. At the end of September 2015, inflation swaps constituted around 0.1 per cent of total OTC IRD notional value outstanding at SwapClear.

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



* Data counts two sides of each trade
 Source: LCH.C Ltd

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



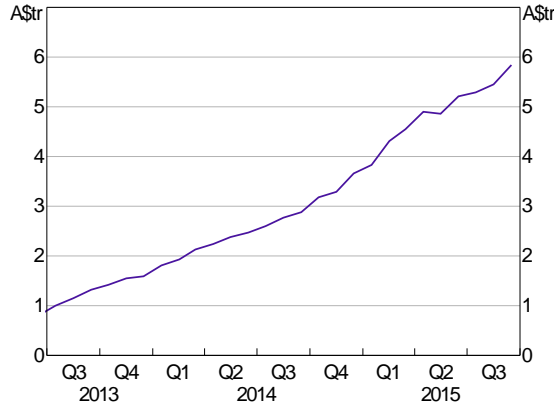
* Data counts two sides of each trade
 Source: LCH.C Ltd

3.2.2 Australian activity in SwapClear

From early 2012, the major Australian banks began to centrally clear a significant proportion of their OTC IRD trades indirectly, as clients 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, the four major Australian banks have joined SwapClear as clearing participants: the Australia and New Zealand Banking Group Limited (ANZ) joined in September 2013; National Australia Bank Limited (NAB) joined in October 2013; the Commonwealth Bank of Australia (CBA) joined in August 2014; and Westpac Banking Corporation (WBC) joined in November 2014.

The total notional value outstanding of the Australian banks across all currencies has increased strongly since late 2012 (Graph 5). Australian banks now aim to centrally clear all eligible new trades, although not all of the stock of outstanding trades has yet been submitted for central clearing. Over the period the four major banks cleared a greater proportion of their activity as direct participants, although some continue to clear trades in certain currencies as clients of other direct clearing participants.

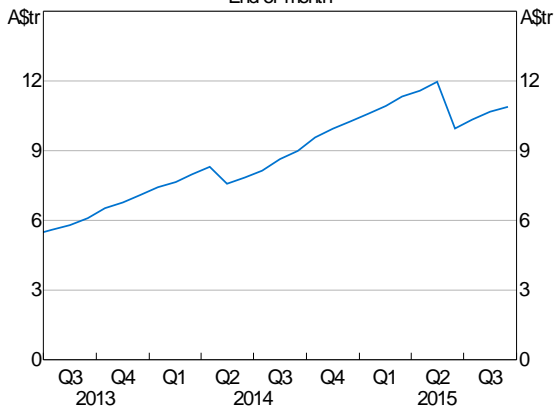
Graph 5
SwapClear: Notional Value
Outstanding of Australian Banks (Stock)*
 End of month



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

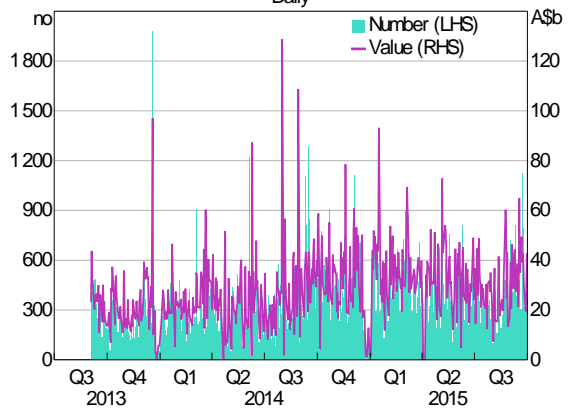
An estimated 92 per cent of the notional value outstanding of all centrally cleared AUD-denominated OTC IRD trades is cleared via SwapClear. Australian banks' clearing activity has been part of a broader upward trend in notional value outstanding of AUD-denominated OTC IRDs cleared via SwapClear. The total notional value outstanding of AUD-denominated OTC IRDs cleared via SwapClear has grown from A\$7.8 trillion to A\$10.9 trillion over the Assessment period (Graph 6).⁶ In June 2015, the notional value outstanding of AUD-denominated contracts fell due to a triReduce compression cycle for AUD-denominated trades, which compressed around A\$2.15 trillion. A triReduce compression cycle was also completed in May 2014, compressing A\$1.07 trillion.⁷ Although the rate at which new AUD-denominated trades are registered has been fairly stable over the past year (Graph 7), notional value outstanding, excluding compression, has continued to increase because many contracts have long tenors.

Graph 6
SwapClear: Notional Value of
AUD-denominated Trades Outstanding (Stock)*
 End of month



* Data counts two sides of each trade
 Source: LCH.C Ltd

Graph 7
SwapClear: Number and Notional Value of
AUD-denominated Trades Registered (Flow)*
 Daily



* Data counts two sides of each trade
 Source: LCH.C Ltd

6 These values count two sides of each trade.

7 These compression values count both sides of each centrally cleared trade.

3.3 Risk Management in SwapClear

A CCP is exposed to potential losses arising in the event of a clearing participant default. LCH.C Ltd manages this risk in a number of ways, including through 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 clearing 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 DMPs, including their ability to value and bid on the portfolio of a defaulting participant.

3.3.2 Margin collection

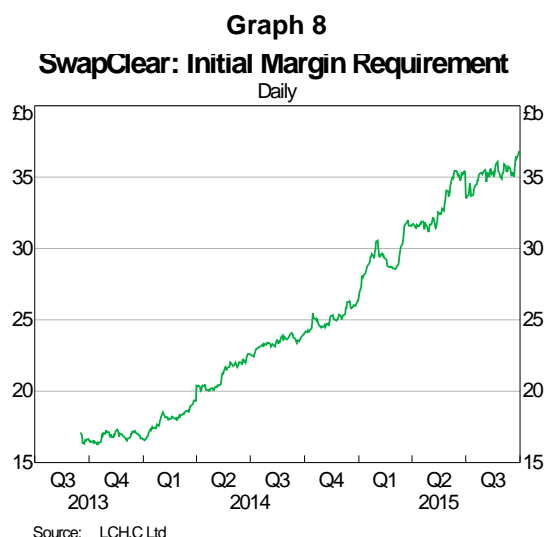
LCH.C Ltd covers its credit exposures to its SwapClear participants by collecting several types of margin.

- *Variation margin.* All SwapClear positions are marked to market at end-of-day and three times intraday. Variation margin is collected from participants with loss-making positions and paid to those with profit-making positions. This practice ensures that uncovered losses on SwapClear participants' positions do not accrue over time.
- *Initial margin.* In the event of a clearing participant default, LCH.C Ltd would be exposed to risk arising from potential changes in the market value of the defaulting participant's open positions between the last settlement of variation margin and the close out of these positions. LCH.C Ltd collects initial margin to mitigate this risk. LCH.C Ltd will only register trades if, at the point of registration, there are sufficient resources at the clearing participant level, either in the form of initial margin or the real time trade registration component of the default fund (see Section 3.3.3), to cover the potential future exposure of the trade.
- *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 model. The model sets initial margin requirements to cover potential losses over a five-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 client positions; initial margin requirements on the positions of clients of participants are scaled up accordingly.⁸

Graph 8 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 backtesting (described in CCP Standard 6.6); in addition, the adequacy of the model assumptions is assessed using quarterly sensitivity analysis (see CCP Standard 6.6).



3.3.3 Pooled financial resources

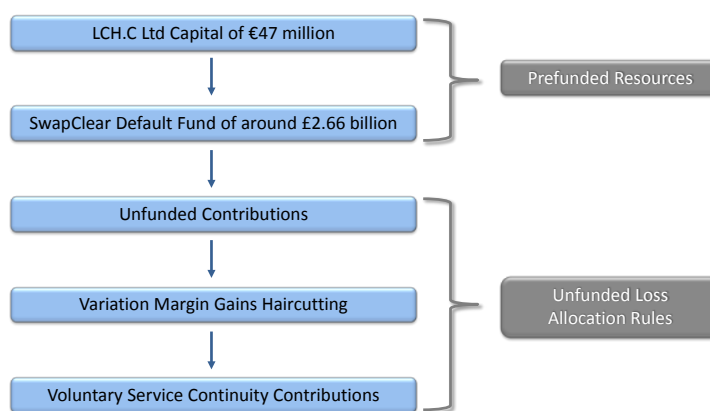
In the event of a clearing participant default, any losses arising would first be covered by the margin and other collateral posted by the defaulter across all LCH.C Ltd services in which it participated.⁹ Should these resources prove insufficient to meet LCH.C Ltd's obligations, LCH.C Ltd may draw on other resources in the SwapClear default waterfall.¹⁰ This is depicted in Figure 1, which shows the order in which financial resources would be used to cover default losses in excess of the defaulter's collateral, as at September 2015.

⁸ The additional two-day holding period for client positions allows time for clients to decide whether to seek to port their portfolio to another clearing participant, as well as time to carry out any such transfer.

⁹ A clearing participant that defaulted would be deemed to have defaulted in all LCH.C Ltd services. If any of that clearing participant's margin and default fund contributions for a given service were not required to meet losses in that service, they would be applied to losses in any other service of which that clearing participant was a member.

¹⁰ LCH.C Ltd maintains a default waterfall for the SwapClear Global service, while LCH.Clearnet LLC maintains a default waterfall for the SwapClear US-based service. The two entities are legally separate, and resources from the waterfall of one service cannot be used to cover losses at the other. Similarly, losses in one LCH.C Ltd service cannot be applied to the mutualised resources of the default waterfall of another LCH.C Ltd service. In an extreme situation, a given LCH.C Ltd service could be closed, while the other services remained open.

Figure 1
SwapClear Default Waterfall after the
Defaulter's Collateral as at 30 September 2015



Source: LCH.C Ltd

Prefunded resources

In the event that all of the defaulting clearing participant's margin and other collateral (including its contribution to the SwapClear default fund) were exhausted, LCH.C Ltd would seek to cover remaining losses arising from the default 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 (£2.26 billion at end September 2015) and an additional component that supports the intraday provision of credit needed to facilitate 'real time' trade registration (£400 million as at September 2015). Both components are available to cover losses from participant defaults. LCH.C Ltd would use a slice of its own capital (€47 million as at September 2015) before allocating losses to the default fund contributions of non-defaulting participants.

Default fund core component

The core component of the default fund is calibrated to cover any losses LCH.C Ltd would incur if the two clearing participants (including their affiliates and clients) with the largest exposures defaulted under extreme but plausible conditions, after using the defaulters' initial margin and monthly DFAM. This is intended to meet the cover two requirement under CCP Standard 4.4 and its equivalent under the European Market Infrastructure Regulation (EMIR).^{11 12} (The European regulatory regime for CCPs is discussed further in Section 3.5.1.)

11 CCP Standard 4.4 states 'a central counterparty that is involved in activities with a more complex risk profile or that is systemically important in multiple jurisdictions should maintain additional financial resources to cover a wide range of potential stress scenarios that should include, but not be limited to, the default of the two participants and their affiliates that would potentially cause the largest aggregate credit exposure for the central counterparty in extreme but plausible market conditions.'

The core component is resized on the first business day of each month. LCH.C Ltd sums the largest two participant stress-test losses over initial margin (STLOIM) over a 60-day look-back period, adds a buffer, and then subtracts the amount of monthly DFAM called by LCH.C Ltd.¹³

LCH.C Ltd calls monthly DFAM from the participant with the largest STLOIM used in the prior calculation. LCH.C Ltd uses monthly DFAM to balance between 'defaulter pays' and mutualised resources, ensuring that a participant with a large exposure relative to other SwapClear members sufficiently contributes to the resources required to cover those exposures. Monthly DFAM is not mutualised; it can only be used to cover losses from the participant that posted it. Since October 2014 it has been calculated as that participant's largest STLOIM under any scenario in the look-back period minus 45 per cent of the combined stressed exposure value and buffer.¹⁴

LCH.C Ltd calls daily DFAM from those participants and affiliates with STLOIM that exceed a predefined proportion of the default fund. The relevant default fund proportion is based on those participants' internal credit scores (ICSs). The amount called is the difference between the participant's STLOIM and the relevant proportion of the default fund on that day (less any monthly DFAM paid). If a participant is called for monthly DFAM, the value of monthly DFAM paid is offset against the amount of daily DFAM that the participant is obliged to pay.¹⁵ Like monthly DFAM, daily DFAM is not mutualised; it can only be used to cover losses from the participant that posted it.

Graph 9 demonstrates how the combination of default fund resizing based on stress-test exposures and the collection of additional margin on concentrated risk positions via the daily DFAM mechanism ensures that, in aggregate, LCH.C Ltd maintains sufficient financial resources to meet the cover two requirement. The dotted line reflects stress-test losses minus the value of applicable resources held by LCH.C Ltd (initial margin and, after October 2014, monthly DFAM); the solid line reflects also the value of daily DFAM levied from participants, which is only received by LCH.C Ltd the morning following the day on which stress-test exposures are based (see CCP Standard 4.7 for further detail).¹⁶

12 EMIR is also known as *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*. EMIR is an EU Regulation and therefore must be applied in its entirety across the EU; implementing legislation is not required in each EU member state.

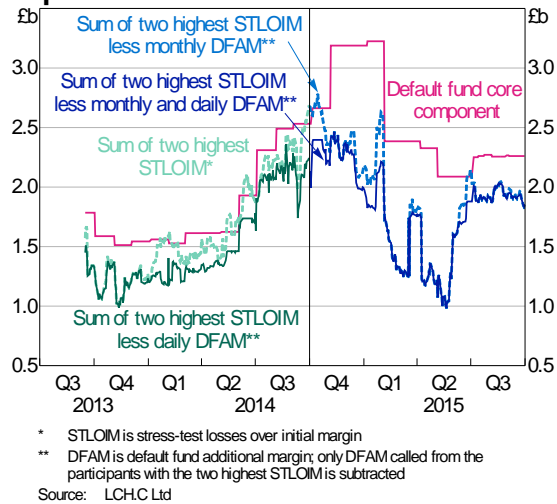
13 The STLOIM of a participant and its affiliates is based on the stress-test losses and initial margin of the participant, its affiliates, and all the clients of the participant and its affiliates.

14 LCH.C Ltd changed the way that monthly DFAM is determined during the Assessment period. Until the end of September 2014, monthly DFAM was called from the SwapClear participant with the largest STLOIM if that STLOIM was determined to be 'outsized' relative to that of other participants.

15 This also changed during the Assessment period. Prior to October 2014, a participant's daily DFAM obligations did not take into account any monthly DFAM already held from the participant.

16 Prior to Q4 2014, Graph 9 shows: the default fund core component; the two highest STLOIM for the same scenario, net of daily DFAM (solid line); and the two highest STLOIM for the same scenario, without adjusting for daily DFAM (dotted line). From Q4 2014, Graph 9 shows: the default fund core component; the two highest STLOIM for the same scenario, net of daily and monthly DFAM (solid line); and the two highest STLOIM for the same scenario, less only monthly DFAM (dotted line).

Graph 9
SwapClear: Default Fund and Stress-test Losses



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 house 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 must novate or reject new trades within 10 or 60 seconds (depending on execution venue). 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 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 'real time trade registration 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 half of this component at any time.

Unfunded loss allocation rules

In very extreme cases it is possible that prefunded financial resources could be insufficient to fully absorb default-related losses, leaving the CCP with an uncovered credit loss shortfall. In such an event, LCH.C Ltd would allocate remaining losses to surviving clearing participants through 'loss allocation rules', which are described in detail in CCP Standard 4.8.

- *Unfunded contributions.* For each default, LCH.C Ltd is able to call unfunded contributions from non-defaulting participants up to the value of their last default fund contribution, subject to a maximum of three defaults in any six-month period.

- *Variation margin gains haircutting.* LCH.C Ltd may apply haircuts to the variation margin payments owed to non-defaulting participants whose positions make gains, up to a cap.
- *Voluntary service continuity contributions.* Should losses remain, LCH.C Ltd would ask non-defaulting participants to make voluntary contributions.
- *Wind down.* 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 CCP Standard 3.5). In the event the SwapClear service was wound down, all outstanding SwapClear contracts would be terminated and SwapClear would calculate a sum owing between it and each non-defaulting clearing participant (see CCP Standard 4.8 for further details).

3.4 Operational Performance of the SwapClear Service

LCH.C Ltd manages operational risk in accordance with the LCH.C Group Operational Risk Policy, which has been developed in accordance with the LCH.C Group Risk Governance Framework. LCH.C Ltd targets IT system availability for the SwapClear service equivalent to at least 99.71 per cent, i.e. system unavailability of no more than 60 minutes in any one calendar month.¹⁷ SwapClear met this target in 10 of the 15 months in the Assessment period. However, over the period as a whole IT system availability averaged 99.62 per cent (see Table 3).

LCH.C Ltd targets a maximum capacity utilisation of 50 per cent for the SwapClear service. LCH.C Ltd deems its capacity utilisation target to be met if the service has the capacity to handle the greater of: two times current daily average throughput; or the projected daily average throughput in 12 months' time. This target was met in each month over the period.

Table 3: SwapClear IT Service Availability and Capacity Usage in 2014/15

| Period | IT Availability Target Months met | IT Availability Per cent | IT Capacity Usage Target Months met |
|-------------------|--------------------------------------|-----------------------------|--|
| Q3 2014 – Q3 2015 | 10 | 99.62 | 15 |

Source: LCH.C Ltd

3.4.1 Incidents affecting service availability

During the Assessment period, the SwapClear service experienced a number of operational incidents that were classified by LCH.C Ltd as having a severe or major impact. Many of these incidents resulted in the delayed opening of the SwapClear service. During the period July 2014 to December 2014, the service opened late on five days; on no occasion was the opening delayed by more than 30 minutes. The majority of these incidents occurred following an extension of the SwapClear operating hours in late October 2014. The extension to the operating hours was rolled back in early December 2014 (the extension of the SwapClear operating hours is discussed further in Section 3.6.8). There were an additional two incidents causing delays of less than 30 minutes to the SwapClear opening time in December following this change. Between January 2015 and September 2015, there were two major-to-severe incidents that resulted in late service opening; the delay caused by each of these incidents

¹⁷ LCH.C Ltd applies a weighting system when calculating service unavailability: a weight of 1 is applied to minutes for which there is full service outage; a weight of 0.5 or 0.25 is applied for partial outages, depending on the nature of the incident; and a weight of 0 is applied for losses of resilience (i.e. when the service is still operating but, for example, an additional server used to share the load becomes unavailable).

was greater than 90 minutes. Other incidents during the Assessment period included delayed trade registration and incorrect margin calls.

LCH.C Ltd has taken remedial action for each of the major incidents that occurred during the Assessment period. A number of system improvements that aimed to prevent future operational issues were incorporated into a system upgrade that was implemented in October 2015. More broadly, LCH.C Ltd has carried out an extensive program of work throughout the Assessment period as it seeks to enhance its resilience to operational risk. This program, which continues work begun during the 2013/14 period, has included changes to LCH.C Ltd's governance of operational risk, and the implementation of a number of changes to internal controls in areas such as change management and incident handling. This work is discussed in detail in Section 3.6.8 and CCP Standard 16.

3.4.2 Participation in the SwapClear service

There were 98 direct clearing participants in the SwapClear service as at 30 September 2015, up from 90 clearing participants at the start of the Assessment period. Four Australian banks were direct clearing participants as at 30 September 2015, two of which became direct participants during the Assessment period (see Section 3.6.9). The SwapClear service currently has direct participants domiciled in 40 countries.

3.5 LCH.Clearnet 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 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 by the BoE under English and EU legislation.

During the period, the Bank entered into an updated Memorandum of Understanding (MoU) with the BoE regarding supervision of CS facilities.¹⁸ The MoU provides a framework for bilateral cooperation, including information sharing and investigative assistance. This replaces the Bank's original MoU with the UK Financial Services Authority, which was entered into at the time that LCH.C Ltd was licensed in Australia and transitioned to the BoE when it took over responsibility for CCP supervision.¹⁹ The Bank also engages with the BoE on LCH.C Ltd supervision matters through the global multilateral cooperative arrangement, the LCH.C Ltd Global College, which was established in 2012 (see Section 3.5.2).

3.5.1 The regulatory regime

EU regulation

In July 2012, the EU introduced a harmonised framework for the regulation of FMIs, including CCPs, incorporated in the region: EMIR. EMIR and its associated technical standards largely implement the

18 The MoU is available at <<http://www.rba.gov.au/payments-system/legal-framework/pdf/memorandum-2015-05-25.pdf>>.

19 Under Section 827A(3) of the Corporations Act, in deciding whether to grant an overseas CS facility an Australian CS facility licence, the Minister of Finance must have regard to, among other things, whether adequate arrangements exist for cooperation between the Bank and the authority responsible for supervision of the facility in its home jurisdiction.

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 the UK, this is the BoE.

Under EMIR, CCPs incorporated in the EU were required 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 in June 2014, in consultation with the LCH.C Ltd EMIR College (see Section 3.5.2).

In May 2015, the EC announced a review of EMIR, as required under Article 85(1) of EMIR and launched a formal consultation process. The EC stated that the review would focus on CCPs' access to central bank liquidity facilities, the functioning of supervisory colleges for CCPs, and the margin practices of CCPs. The consultation period ended on 13 August 2015. The Bank will monitor this review with respect to any potential material changes to the regulatory regime applicable to LCH.C Ltd in its home jurisdiction.

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 could threaten the CCP's solvency
- ensure under its rules that the positions or assets of clients of defaulting participants cannot be ported to a non-defaulting participant without the consent of the client and the non-defaulting participant
- take measures to monitor and reduce financial crime and market abuse.

The BoE recognised LCH.C Ltd under FSMA on the same date that it authorised LCH.C Ltd under EMIR. LCH.C Ltd had previously been recognised as a 'recognised clearing house' since 1988 (as International Commodities Clearing House Ltd).

In addition, the 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 *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.

3.5.2 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 EMIR supervisory college plays a role in the ongoing supervision of LCH.C Ltd, including when LCH.C Ltd applies to the BoE to expand its services or make significant changes to its risk model. For example, EMIR college non-objection was required for LCH.C Ltd to begin clearing inflation swaps through the SwapClear service (see Section 3.6.7). The EMIR college also facilitates the exchange of information among its members.

The BoE has also established a Global College for LCH.C Ltd, membership of which extends beyond the EMIR supervisory college. The Bank is represented on the Global College. The Global College's mandate was originally limited to the SwapClear service; although SwapClear remains a primary focus of the college's work, in late 2014 the scope of its work was extended to cover all of LCH.C Ltd's services. The college facilitates the exchange of information and discussion of supervisory matters concerning LCH.C Ltd's services, including through in-person meetings and regular exchanges of data.

The BoE undertook a review of the organisation, scope and membership of the Global College in August 2014. The review found that the Global College was meeting its objectives; the BoE has nevertheless identified and taken steps to implement certain improvements such as greater involvement of the college in assessing LCH.C Ltd against the Principles and more regular sharing of data.

During the Assessment period, the BoE also established a CMG for LCH.C Ltd. The role of the CMG is discussed in Section 3.5.4.

3.5.3 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, 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'.²⁰ 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. The BoE also conducts thematic reviews across all CCPs for which it has oversight responsibility.

The BoE publishes an annual report on its oversight of UK FMIs. The latest report, published in March 2015, summarises the BoE's supervisory priorities during the period from March 2014 to March 2015, as they apply across all FMIs, and FMIs' progress against them.²¹ These priorities, focusing on their relevance to the UK CCPs, were:

20 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>>.

21 BoE (2015), *The Bank of England's Supervision of Financial Market Infrastructures — Annual Report*. Available at <<http://www.bankofengland.co.uk/publications/Documents/fmi/annualreport2015.pdf>>.

- *Credit and liquidity risk.* This included CCP's stress-testing practices. The BoE highlighted two topics: the need to balance risk sensitivity and procyclicality in margin requirements; and the construction of stress scenarios to cover extreme but plausible conditions. The BoE also noted that it had expanded the Sterling Monetary Framework to allow CCPs operating in UK markets that are authorised under EMIR or recognised by the European Securities and Markets Authority to access central bank liquidity and to help the CCPs manage their liquidity risk.
- *Recovery and resolution.* The BoE had required all UK CCPs to put in place rules to allocate non-default losses. In line with the BoE's expectations, all UK CCPs had put in place rules to allocate investment losses among their participants, which satisfied the BoE's supervisory priority. With respect to non-default losses other than investment losses, the BoE noted its agreement with the conclusion of the CPMI-IOSCO report *Recovery of Financial Market Infrastructures* that 'losses relating to general business risks are properly the responsibility of the owners of the FMI'.²² The BoE therefore noted that tools other than allocation to participants may be suitable for recovery from such losses.
- *Operational risk.* A key focus of the BoE's work on FMI operational resilience has been management of cyber risk and increasing the resilience of FMIs to cyber attacks. The BoE flagged that this work, conducted in conjunction with other UK authorities, would continue into 2015.
- *Governance.* The BoE noted that all UK CCPs had met EMIR requirements to have a Board risk committee composed of representatives of both clearing participants and clients as well as independent Board members.
- *Disclosure.* The BoE reported that all UK FMIs had published, or were in the process of completing, the CPMI-IOSCO qualitative disclosure framework.

The report also summarised the BoE's broad supervisory priorities for the period from March 2015 to March 2016:

- *Credit and liquidity risk.* The BoE noted that it would continue its work from 2014 on CCPs' stress-test scenarios, and would also consider processes for managing clearing member defaults, intraday monitoring of credit and liquidity risk, and risk model validation.
- *Recovery and resolution.* The BoE noted that it expected the EC to submit a legislative proposal on CCP recovery and resolution, possibly extending to other FMIs. The BoE's position was that EU CCPs should be required to maintain a recovery plan and have comprehensive loss-allocation rules; and that the legislation on resolution should also be consistent with the Financial Stability Board's internationally agreed guidance. The EC is expected to submit a legislative proposal on CCP recovery and resolution, possibly extending to other financial market infrastructures (FMIs), in the coming period.
- *Operational risk.* The BoE assigned supervisory priorities to address the root cause of excess operational risk at certain FMIs that did not meet their operational targets during 2014. The BoE also flagged that it would continue to focus on cyber resilience at all supervised FMIs, including requiring more FMIs to participate in vulnerability testing and responding to gaps.
- *Governance.* The BoE noted that it would focus on the quality of governance at UK CCPs to ensure that commercial objectives were not inappropriately prioritised over systemic risk

²² See CPMI-IOSCO (2014), *Recovery of Financial Market Infrastructures*, Bank for International Settlements, Basel, available at <<http://www.bis.org/cpmi/publ/d121.htm>>.

management. In addition, the BoE highlighted the role of users of CCPs in ensuring the robustness and resilience of CCPs' risk management, including through their representation on CCPs' Board risk committees.

- *Disclosure.* In February 2015, CPMI and IOSCO published a finalised set of quantitative disclosure standards for CCPs that are intended to complement descriptive disclosures under the Disclosure Framework.²³ The BoE expects UK CCPs to begin making the public quantitative disclosures set out in the CPMI-IOSCO quantitative disclosure standards by no later than 1 January 2016.

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

3.5.4 Resolution

As a UK-based CCP, any resolution of LCH.C Ltd would be governed by English law. Under the UK's legal framework, resolution of CCPs is governed by the UK *Banking Act 2009* (which was extended to include CCPs by the UK *Financial Services Act 2012*). In August 2014, secondary legislation was introduced to enter the resolution regime into force for CCPs. In March 2015, the UK Treasury issued an updated version of its *Banking Act 2009: Special Resolution Regime Code of Practice*, which provides guidance as to how and in what circumstances the authorities would use the special resolution tools (see Box B). The BoE is the resolution authority for UK CCPs.

In 2015, the BoE established a CMG for LCH.C Ltd. The CMG will discuss and facilitate development of the resolution plan for LCH.C Ltd, taking into account the cross-border nature of LCH.C Ltd's business. Membership of the CMG comprises a number of regulators from within and also outside the EMIR and Global Colleges; the Bank is represented on the CMG. The CMG met for the first time in October 2015.

²³ The CPMI-IOSCO *Public Quantitative Disclosure Standards for Central Counterparties* is available at <<http://www.bis.org/cpmi/publ/d125.pdf>>.

Box B: Special Resolution Regime for UK CCPs

Legislative changes have been made in the UK over recent years to introduce a resolution regime for CCPs. In March 2015, the UK Treasury published the Special Resolution Regime Code of Practice for CCPs (the Code). This box provides a summary of the Code, covering the roles of the authorities in the Special Resolution Regime (SRR), objectives of the SRR, the powers available to the BoE for the purposes of protecting financial stability by effectively resolving financial institutions (the 'stabilisation powers') and the regulatory pre-conditions to exercising the stabilisation powers.

Roles of authorities

The Code outlines the roles of the relevant UK authorities with regards to the SRR. The BoE is responsible for determining if a CCP is failing or likely to fail, and for the operation of the SRR, including which tools to use, and its implementation. The UK Treasury is responsible for decisions with implications for public funds, for ensuring the UK's ongoing compliance with its international obligations, and for matters relating to the wider public interest. The UK Treasury is responsible for the exercise of some of the ancillary powers under the SRR (particularly those where Parliamentary scrutiny is required), including the power to modify the law and powers in relation to compensation.

The code states that the BoE must consult the Financial Conduct Authority and the UK Treasury (and the Prudential Regulation Authority, in certain situations) on the use of its powers and whether certain regulatory pre-conditions were met.

Objectives of the Special Resolution Regime with respect to CCPs

Section 4 of the UK *Banking Act 2009* (the Banking Act) establishes five special resolution objectives. These objectives reflect the purpose of the SRR in the Banking Act and frame the BoE's use, or consideration of use, of the stabilisation powers that it holds. The five objectives are, without ranking:

- Protect and enhance the stability of the financial systems of the UK
- Protect and enhance public confidence in the stability of the financial system
- Maintain the continuity of CCP clearing services
- Protect public funds
- Avoid interfering with property rights in contravention of a Convention Right (within the meaning of the UK *Human Rights Act 1998*).

As meeting the objectives may involve trades-offs, the BoE has discretion over how to weigh each of the objectives depending on the prevailing circumstances. The BoE is required to consider the effect of its likely actions (including inaction) and assess them in light of the objectives, in addition to considering restrictions and conventions of public law. The Code requires that when an action is taken under the SRR, the BoE must disclose how its actions were informed by the objectives and how it balanced the objectives against each other.

Stabilisation Powers

Under the Banking Act, the BoE has the following powers to protect financial stability by effectively resolving a CCP:

- The power to transfer some or all the business of a CCP or its group undertaking to a commercial

purchaser

- The power to transfer some or all the business of a CCP or its group undertaking to a bridge CCP (a company wholly owned and controlled by the BoE)
- The power to transfer the ownership of the CCP to any person.

The first two powers allow the BoE to transfer clearing participant agreements, preserving the position of each participant and the rules of operation of the failed CCP.

The Code states that the first stabilisation power is preferred if it is cost-effective. However, finding a private sector purchaser may be difficult due to the small number of firms in the industry and the different nature of each CCP's assets and liabilities. Operational constraints such as IT infrastructure compatibility would also be an obstacle. The BoE has identified that the second stabilisation power may be more appropriate if a commercial purchaser cannot be found and the CCP needs a temporary administrator to continue its operations. A partial property transfer may be appropriate when the losses are incurred in a segregated product line.

The Banking Act also grants the BoE supplementary powers to ensure the effectiveness of resolution, such as continuity obligations to ensure the transferred CCP can operate effectively.

Regulatory pre-conditions

The Banking Act specifies four conditions that the BoE must be satisfied have been met for a stabilisation power to be exercised.

- The CCP in question is not satisfying, or is likely to cease satisfying, the minimum conditions a CCP must meet to be recognised as a CCP.
- It is not reasonably likely that action will be taken by the CCP that will enable it to continue providing critical services, while still meeting the minimum conditions. The BoE must take into account any action that the CCP is proposing to take, including actions required by EMIR or actions it will take in recovery.
- Exercising stabilisation powers is required to meet the objectives of the SRR regarding financial stability and public confidence, taking into account the public interest.
- The UK Treasury has recommended the BoE exercise the stabilisation power to protect the public interest and it is the BoE's opinion that the use of the power is appropriate.

3.6 Material Developments and Regulatory Priorities Relevant to LCH.C Ltd's SwapClear Service

LCH.C Ltd has implemented a number of changes over the Assessment period to support its provision of the SwapClear service to the Australian market. These changes largely have been in response to the regulatory priorities set out by the Bank in the 2013/14 Assessment. LCH.C Ltd has also engaged in further dialogue with the Bank regarding how its operational and governance arrangements promote stability in the Australian financial system. In addition, over the period LCH.C Ltd has made a number of changes that affect the SwapClear service and the management of risks within LCH.C Ltd more broadly, including enhancements to existing processes and implementation of new products.

3.6.1 CCP risk management

LCH.C Ltd made several changes to the way it manages credit risk throughout the 2014/15 Assessment period.

Daily and monthly DFAM

In October 2014, LCH.C Ltd made changes to the way that daily and monthly DFAM is called for the SwapClear service (see CCP Standard 4.4). Any call for daily DFAM from a clearing participant now reflects the value of any monthly DFAM that that participant has already contributed, which reduces the amount of daily DFAM the participant may be required to post.

Additional margin applied to client positions

For clearing participants assessed by LCH.C Ltd to be below a certain credit quality, additional margin is called to cover part or all of any stress-test losses over margin held. Previously, this additional margin was only applied to house positions. In mid-2014, LCH.C Ltd's Executive Risk Committee (ERCo) approved an amendment to the LCH.C Group Counterparty Credit Risk Policy, stipulating that in general additional margin will also be applied to client accounts.

Client buffer

During the Assessment period, LCH.C Ltd introduced an optional client buffer account for its clearing participants (see CCP Standard 4.4). The client buffer account holds collateral lodged by the clearing participant to cover client liabilities above the collateral value in the specific client accounts. This increases clients' ability to lodge trades throughout the day (and to meet intraday margin liabilities on existing trades). A single client buffer account is used to cover all of a clearing participant's client accounts. The clearing participant can fund the client buffer in cash in one of GBP, EUR, USD (but not a mix). Following this change, LCH.C Ltd would only apply exposures from clients' trade registrations to other sources of financial resources, such as the real-time trade registration (RTTR) fund or excess collateral, if the client buffer was depleted.

Replenishment

LCH.C Ltd has been working towards revising its Recovery Plan in light of guidance published by CPMI-IOSCO in 2014. LCH.C Ltd expects to release an updated version of the Recovery Plan in the coming period. The Bank expects LCH.C Ltd to continue its dialogue with the Bank about its arrangements to replenish the default fund after a clearing participant default in light of this guidance.

Regulatory priority. LCH.C Ltd is encouraged to continue its dialogue with the Bank about its arrangements to replenish the SwapClear default fund in the event of a draw-down following the default of a SwapClear clearing participant. LCH.C Ltd should demonstrate that its current arrangements for returning to the full level of cover required under CCP Standard 4.4 minimise the potential for procyclicality, to the extent practicable and prudent.

Stress testing

CPMI and IOSCO have commenced work to evaluate current stress-testing practices of CCPs, and consider the case for additional guidance to promote consistency and comparability. This work reflects concerns that the relatively high-level requirements set out in the Principles may not provide sufficient guidance to promote a consistent approach to stress testing. The Bank encourages LCH.C Ltd to review its stress-testing arrangements in light of the outcomes of this work.

Regulatory priority. LCH.C Ltd is encouraged to continue to review its interpretation of 'extreme but plausible' market conditions in designing its stress-test scenarios. This work should be undertaken in light of evolving international best practice, including outcomes of CPMI-IOSCO work on stress testing.

3.6.2 Governance

A number of changes were made to the organisational structure and associated governance arrangements of LCH.C Group and LCH.C Ltd during the 2014/15 Assessment period.

LCH.C Group Chief Operating Officer and LCH.C Ltd Chief Executive Officer

In January 2015, LCH.C Group created a new Chief Operating Officer (COO) position, bringing product and business development activities together across the three Group CCPs. At the same time, the responsibilities of the LCH.C Ltd Chief Executive Officer (CEO) role were changed to focus more on the operations of the CCP. The LCH.C Ltd CEO still retains control over product and business decisions related to LCH.C Ltd, and has a veto over proposals made by the Group COO with respect to LCH.C Ltd. LCH.C Ltd's former CEO, Michael Davie, was appointed as Group COO and Martin Pluves was announced as the new CEO of LCH.C Ltd.²⁴

Other senior executive and board changes

There were a number of other personnel changes within LCH.C Group and LCH.C Ltd during the Assessment period. In early August, LCH.C Ltd appointed Roger Nolan as LCH.C Ltd's Chief of Staff, reporting to the LCH.C Ltd CEO. This role involves responsibilities regarding LCH.C Ltd governance, operational risk, stakeholder relationships, financial management, strategy, change management and human resources, bringing in aspects of the former LCH.C Ltd COO role (see CCP Standard 2.5).

In March 2015, Prof Dr Lex Hoogduin succeeded Jacques Aigrain as Chairman of the LCH.C Group Ltd Board and the LCH.C Ltd Board. In April 2015, LCH.C Group appointed Steve Briscoe as the new Group Head of Technology and Operations. At the same time, Shona Milne was appointed to the LCH.C Ltd Board as an independent non-executive director, and Stephen Compton as a board member representing users.

In July 2015, the London Stock Exchange Group plc (LSEG) appointed Donald Brydon as Chairman of the LSEG Board. LSEG maintains a majority stake in LCH.C Group and two LSEG directors sit on the LCH.C Group Board while one LSEG director sits on the LCH.C Ltd Board. In September 2015, Nikhil Rathi replaced Alexander Justham as CEO of London Stock Exchange plc and took his place on the LCH.C Ltd Board.

Listed interest rate derivatives

In early 2015, LCH.C Ltd amended its governance arrangements to incorporate its listed interest rate derivatives business into the SwapClear business. The Global Head of SwapClear, Daniel Maguire, now has responsibility for both businesses. LCH.C Ltd currently offers clearing of listed EUR and GBP IRDs traded on NLX, a London-based multilateral trading facility. LCH.C Ltd has a dedicated listed interest

²⁴ In October 2015, the London Stock Exchange Group (LSEG) announced that Michael Davie would become the LSEG Head of Rates Services and serve as the Chairman of CurveGlobal. As at November 2015, the business heads who previously reported to the LCH.C Group COO report to the LCH.C Group CEO.

rates default fund, although it is extremely small compared to the SwapClear default fund.²⁵ LCH.C Ltd currently risk-manages OTC and listed IRDs separately, although it has announced its intention to launch a portfolio margining capability, subject to regulatory approval.²⁶

3.6.3 Collateral

Australian dollar cash as initial margin

The Bank's 2013/14 Assessment set a regulatory priority that LCH.C Ltd consider accepting AUD cash as initial margin. The Bank noted that this would 'support effective access by accommodating local market practices' as contemplated 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). It would also contribute to LCH.C Ltd's compliance with CCP Standard 5.2, which requires that a CCP 'consider allowing the use of collateral commonly accepted in the relevant jurisdictions in which it operates'.²⁷

Proposals to accept new collateral types must be approved in accordance with LCH.C Ltd's internal risk governance process, which includes review and approval by its Asset and Liability Committee (ALCo), ERCo and the LCH.C Ltd Risk Committee. This internal approval has now been granted.

Changes to LCH.C Ltd's acceptable collateral also require regulatory approval; LCH.C Ltd is now seeking regulatory approval from relevant regulators.

LCH.C Ltd has also implemented technical changes required to accept AUD cash as initial margin. LCH.C Ltd's acceptance of AUD cash as initial margin is also contingent on the establishment of the Australian PPS arrangements (see Section 3.6.4), and the hiring of an additional staff member in LCH.C Ltd's Sydney office.

Regulatory priority. The Bank expects LCH.C Ltd to proceed with its plans to accept AUD cash as initial margin, subject to approval by the relevant regulators.

3.6.4 Money settlements

ESA and Australian PPS arrangements

When LCH.C Ltd's licence was varied to allow it to offer the SwapClear service in Australia in 2013, the Bank required LCH.C Ltd to open an ESA and to use that account to settle its AUD obligations. This reflected LCH.C Ltd's systemic importance to the Australian financial system, in accordance with CCP Standard 9.1 and the CFR Regulatory Influence Policy. In its 2013/14 Assessment, the Bank further specified that LCH.C Ltd should develop and implement arrangements for the settlement of AUD obligations through its ESA.

LCH.C Ltd was granted an ESA in late 2014, and began using its ESA to effect its AUD concentration payments (i.e. settlement of AUD obligations between LCH.C Ltd and its settlement banks) in late

25 The listed interest rates default fund was £35 million at end September 2015. By comparison, the SwapClear default fund was £2.66 billion at that time.

26 The proposed portfolio margining service will not initially include AUD products and Australian clearing participants will not initially use the service.

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

March 2015. The CFR Regulatory Influence Policy also specifies that, in order to operate an ESA, a CCP would be expected to hold a specified quantum of Bank-eligible collateral in an Austraclear account in its own name. LCH.C Ltd was granted an Austraclear account in its own name in November 2014 and holds a specified quantum of Bank-eligible collateral in that account.

To facilitate payments to and from its clearing participants, LCH.C Ltd operates a payment system known as the PPS. LCH.C Ltd is currently in the process of completing the implementation of an Australian PPS similar to the model currently operated in the UK and US (see CCP Standard 6.8). 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 (settlement) bank and to use those PPS arrangements to settle its AUD obligations using its ESA (i.e. to 'self-PPS'). This will simplify and streamline AUD settlement arrangements for those participants, avoiding potential risks from tiering and removing those participants' reliance on third-party commercial settlement banks.

Regulatory priority. LCH.C Ltd should complete its implementation of PPS arrangements in Australia.

3.6.5 Liquidity risk

Consistent with the Bank's 2014/15 regulatory priorities, LCH.C Ltd has made some changes to its AUD liquidity management practices over the Assessment period. LCH.C Ltd also provided the Bank with information regarding the adequacy of its liquidity reverse stress-testing procedures.

Management of Australian dollar liquidity risk

The Bank's 2013/14 Assessment set a regulatory priority that LCH.C Ltd develop and implement arrangements to manage its AUD liquidity risk, utilising its ESA, as required by CCP Standard 7.7.

During the period, LCH.C Ltd introduced specific arrangements to manage this risk. LCH.C Ltd holds collateral eligible for repo with the Bank in its Austraclear account sufficient to cover its estimated AUD liquidity needs in the event of the default of the two clearing participants and their affiliates with the largest AUD obligations in 'stressed' market conditions. In the event that it needed to access AUD liquidity, LCH.C Ltd would seek to repo this collateral with market counterparts; it has established Global Master Repurchase Agreements with a number of market participants to facilitate this. In the event that it could not liquidate the collateral in the market, LCH.C Ltd could repo the collateral to the Bank under the Bank's standard terms.

LCH.C Ltd also conducts liquidity stress tests on an aggregated basis across all currencies (as well as individually on USD, EUR and GBP) to ensure that it can access sufficient liquidity to cover its overall liquidity needs in the event of the default of the largest two participants and their affiliates in 'extreme but plausible' market conditions. In the event that LCH.C Ltd's AUD liquidity needs exceeded the value it could access using its AUD collateral, it would seek further liquidity by entering into foreign exchange (FX) swaps with market participants.

On a business-as-usual basis, LCH.C Ltd uses the Bank's intraday repo facility to manage its AUD settlements. LCH.C Ltd repos sufficient securities to the Bank to cover its estimated maximum AUD cash outflow over a two-day period across the entire LCH.C Ltd service due to regular clearing activity and market movements.

LCH.C Ltd monitors the value of both stressed and business-as-usual AUD liquidity requirements daily and recalculates each requirement monthly. If the estimated stressed liquidity requirement exceeded the available liquidity from the AUD securities held in LCH.C Ltd's Austraclear account, the ALCo could approve an increase in the value of AUD securities held on an intra-month basis.

The Bank will continue to monitor LCH.C Ltd's management of its AUD liquidity risk over the coming period. LCH.C Ltd intends to hire an additional member of staff for its Sydney office to manage its AUD securities portfolio and support its AUD liquidity management. This will improve LCH.C Ltd's capability to access same-day AUD liquidity from market counterparts.

Liquidity reverse stress testing

The Bank's review of LCH.C Ltd's approach to liquidity stress testing in its 2013/14 Assessment of LCH.C Ltd's SwapClear Service raised some concerns about LCH.C Ltd's use of the total initial margin requirements of the two largest clearing participants to model its cover two variation margin outflows. In its 2013/14 Assessment, the Bank requested that LCH.C Ltd use its reverse stress-testing framework to demonstrate how its approach to modelling variation margin outflows for the purpose of liquidity stress testing captured a sufficient range of extreme but plausible scenarios.

LCH.C Ltd has informed the Bank that it considers its modelled variation margin outflows to be in the extreme but plausible range, for the following reasons:

- initial margin held in respect of different services is summed up with no offset, therefore ignoring likely netting in variation margin flows
- the 'total' margin requirement includes add-ons for sovereign, concentration and wrong-way risks, and therefore goes beyond the 99.7 per cent coverage that is already reflected in initial margin.

In addition, LCH.C Ltd conducts reverse stress tests to determine the minimum level of variation margin that would cause a liquidity shortfall and assesses the plausibility of such a scenario.

The Bank has reviewed LCH.C Ltd's liquidity reverse stress-testing results. These results indicate that the CCP would have access to a significant amount of liquidity in excess of its expected needs, even in extreme but plausible scenarios. For each quarter, LCH.C Ltd concluded that it would be implausible for a liquidity deficit to be generated as a result of increases in variation margin outflows. The Bank has taken comfort from these results that LCH.C Ltd's approach to estimating its variation margin outflows in extreme but plausible conditions delivers appropriate outcomes.

3.6.6 Participant default rules and procedures

Crisis management taking appropriate account of Australian interests

The Bank's 2013/14 Assessment set a regulatory priority that LCH.C Ltd's crisis management arrangements should take appropriate account of Australian stability interests. 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'.

LCH.C Group conducts so-called 'fire drills' to test the Group's capability to manage a major default situation across all services (and re-test issues raised in previous fire drills). In the fire drill conducted in February 2015, the hypothetical portfolio of the defaulted participant in SwapClear included

positions in AUD for the first time. This tested the ability of the SwapClear DMG to hedge, and SwapClear's clearing participants to value and bid on an AUD portfolio.

LCH.C Ltd engaged with the Bank during the Assessment period on the procedures that SwapClear would follow in the event of a default of an Australian clearing participant or a participant with a large AUD portfolio. A particular focus has been how the procedures take account of Australian stability interests. SwapClear would hedge the biggest risks in the defaulter's portfolio first: in the default of a large Australian participant, this could mean that the DMG would hedge the AUD portfolio first. LCH.C Ltd would also have the ability to second a trader with specific AUD experience if it was considered necessary.²⁸ Finally, auctions for a particular currency would be held in the appropriate time zone for that currency, and so the auction of an AUD portfolio would occur when the Australian market was open. The Bank expects to periodically engage with LCH.C Ltd regarding these arrangements.

LCH.C Ltd has also engaged with Australian participants on the DMP and the fire drills. Consequently, LCH.C Ltd has considered changes to its auction participation requirements for participants with small positions in certain currencies. This is likely to be reviewed in due course.

The Bank expects to periodically engage with LCH.C Ltd regarding how its crisis management arrangements take appropriate account of Australian stability interests.

Fire drill of non-default losses

The February 2015 fire drill also tested processes related to non-default losses, in particular its ability to calculate and allocate losses to participants from an outright loss caused by a default of a sovereign counterparty. The fire drill was designed to test LCH.C Ltd's internal processes and did not involve participants. The Bank will continue to engage with LCH.C Ltd about its fire drills in the coming period.

3.6.7 New products and services

LCH.C Ltd launched several new products available for clearing within the SwapClear service during the 2014/15 Assessment period.

In late March 2015, the BoE varied LCH.C Ltd's recognition order to allow it to offer clearing services for OTC derivatives referenced to inflation rates. SwapClear began clearing zero-coupon inflation-indexed swaps denominated in EUR, GBP and USD in April 2015. In July 2015, LCH.C Ltd's Australian CS facility licence was varied to permit SwapClear to offer clearing services to its Australian clearing participants for inflation rate derivatives. LCH.C Ltd consulted with SwapClear clearing participants prior to the launch of inflation rate derivatives clearing, including with regards to proposed changes to the Rulebook and Procedures.

The risks that LCH.C Ltd faces from clearing inflation swaps are similar to those it faces from clearing IRDs and are therefore managed with the existing SwapClear risk management framework. However, some amendments have been made to reflect specific characteristics of these products, including changes to stress-test scenarios and an extension of LCH.C Ltd's SwapClear initial margin model. LCH.C Ltd sources inflation swap pricing and seasonality data from direct clearing participants because available market data sources are less reliable than for other types of swaps. To ensure the

²⁸ The SwapClear DMG would include a group of eight senior traders seconded from clearing participants. The traders would typically have primary experience in EUR, USD and GBP, which are likely to be the biggest portfolios and hence the largest source of risk. LCH.C Ltd has stated that due to similarities in market conventions, these traders would likely be capable of hedging an AUD portfolio.

effectiveness of the pricing mechanism, the quality of these data are managed by a 'crossing mechanism' in which clearing participants must be prepared to trade on prices submitted to LCH.C Ltd.

In addition, in August 2014, SwapClear began to clear USD and GBP denominated basis overnight LIBOR swaps. At this time, SwapClear also extended the tenors for JPY OIS to 30 years.

3.6.8 Operations

LCH.C Ltd has carried out an extensive program of work throughout the 2014/15 Assessment period as it seeks to enhance its operational resilience and management of operational risks. This program, which continues work begun during the 2013/14 period, has included changes to governance of operational risk, and the implementation of a number of changes to internal controls in areas such as change management and incident handling. LCH.C Ltd also continued work to address the Bank's 2013/14 priorities regarding the extension of operating hours and operational support to the Australian time zone.

Extension of operating hours and operational support to the Australian time zone

In its 2013/14 Assessment, the Bank set a regulatory priority for LCH.C Ltd to continue its work to extend operating hours and operational support in the Australian time zone, in accordance with CCP Standards 6.8 and 16.5.

In late October 2014, LCH.C Ltd changed the opening time of its SwapClear service from 7.30 am to 5.00 am UK time (4:30 pm to 2.00 pm AEST), which reduced the amount of time the service was closed from 7.5 to 5 hours. However, LCH.C Ltd experienced a number of operational incidents related to this change in operating hours. In early December 2014, LCH.C Ltd moved the opening time of the SwapClear service back to 6.00 am (3:00 pm AEST).

LCH.C Ltd has since put its project to extend the SwapClear operating hours project on hold while it works to enhance operational resilience and operational risk management. It has introduced, and is continuing to implement, a number of changes to its management of operational risk, including enhancements to its governance, change management and incident management processes.

LCH.C Ltd also conducted an internal review of its start-of-day and end-of-day processes. LCH.C Ltd has developed a number of technical changes in response to this review, which were incorporated into the SwapClear IT systems in October 2015. LCH.C Ltd will monitor the stability of the system following the implementation of these changes and will then decide the appropriate approach to further extending its operating hours. LCH.C Ltd has discussed with the Bank a number of options for extending the operating hours of the service, covering longer-term plans and shorter-term transitional arrangements. The Bank will continue to engage with LCH.C Ltd over the period regarding these proposals. The Bank has emphasised to LCH.C Ltd that, although this remains a priority, the Bank expects any changes to be implemented in a way that maintains the safety and resilience of the CCP.

LCH.C Ltd has increased the number of staff in its Sydney office to 14 at the end of September 2015. The responsibilities of these staff include support for the SwapClear service (including Murex), banking and collateral, as well as risk and compliance.²⁹ Australian participants can seek operational

²⁹ Murex is a third party application, customised by SwapClear to support trade registrations and the computation of margin liabilities.

support from LCH.C Ltd's Sydney-based staff or via LCH.C Ltd staff in London or New York. The Bank considers that LCH.C Ltd has now met the Bank's expectation that it provide appropriate operational support in the Australian time zone. LCH.C Ltd intends to increase the number of staff further later in 2015.

Regulatory priority. The Bank expects LCH.C Ltd to continue its work to extend the operating hours of the SwapClear service, while ensuring the safety and resilience of its operations.

Operational risk reviews

The LCH.C Ltd Board approved the annual review of LCH.C Group's Operational Risk Policy in October 2014. The review expanded the description of LCH.C Ltd's risk appetite and its governance. Scenario analyses are now required to be completed on an annual basis and take into account more factors.

LCH.C Group also engaged an external consulting firm to review LCH.C Ltd's governance of operational risk. The final report made recommendations across six workstreams: governance; data management and governance; business architecture; operational incidents; change delivery; and culture and behaviours. Some of the important changes made by LCH.C Ltd in response to this review include: implementation of a revised incident management framework; introduction of a New Product Approval Committee; work on a change governance project, including development of policies related to testing and quality assurance; creation of a Data Committee that is developing a LCH.C Ltd data policy to manage data collection, integrity and reporting; and more regular and detailed internal reporting on operation risk.

LCH.C Group updated its Group Major Incident Process in December 2014 to incorporate some recommendations stemming from the externally conducted review. These changes included having a consistent Global Incident Management Procedure across the CCPs, which describes the governance of a CCP's response to an operational incident, and a new Materiality Matrix which outlines the circumstances under which incidents will lead to the Major Incident Management Process being invoked.

LCH.C Ltd also conducted a review of the SwapClear IT platform and associated architecture, shared technology and processes during the first half of 2015. The review made a number of recommendations with regards to platform improvements, change management, process automation and risk governance.

Regulatory priority. LCH.C Ltd should continue work to enhance its operational resilience and operational risk management. LCH.C Ltd should continue to implement recommendations arising from recent internal and external operational risk reviews.

The BoE has also identified operational risk as a supervisory priority across all FMIs it supervises. The Bank therefore expects to engage actively with the BoE on this priority.

Cyber risk

LCH.C Ltd began a benchmarking exercise of its cybersecurity arrangements against international standards during the Assessment period. Any actions resulting from the review will be considered for incorporation into LCH.C Ltd's 2016 Cyber Roadmap.

Regulatory priority. LCH.C Ltd is encouraged to continue its dialogue with the Bank on its cyber risk management arrangements. LCH.C Ltd is also encouraged to review its cyber risk management arrangements in light of forthcoming CPMI-IOSCO guidance on cyber resilience for FMIs.

The BoE has also identified cyber risk as a supervisory priority across all FMIs it supervises. The Bank therefore expects to engage actively with the BoE on this priority.

Disaster/Business recovery exercise

In June 2015, LCH.C Ltd conducted a disaster/business recovery exercise to examine the procedures that LCH.C Ltd staff would follow in the event of a physical disruption to its service. This exercise included staff at LCH.C Ltd's Sydney office. Components of the exercise included convening the crisis management team to respond to the hypothetical event, having staff check their ability to log in remotely and testing a system used to contact staff to keep them informed in the case of an emergency. LCH.C Ltd stated that the exercise ran smoothly; some minor changes have been made in response, including updating details in its notification system.

LCH.C Group Business Continuity Management Policy

The LCH.C Group Business Continuity Management Policy was changed in September 2014 to require an annual review of all critical suppliers and dependencies. The purpose of these reviews is to capture information about suppliers, identify any possible concerns or issues and ensure that the supplier has sufficient recovery capability.

3.6.9 Participation and access

Australian clearing participants

Two Australian banks became direct clearing members of SwapClear during the Assessment period: CBA joined in August 2014 and WBC joined in November 2014. ANZ and NAB joined as direct clearing members of SwapClear during the previous Assessment period.

Client clearing

When LCH.C Ltd's CS facility licence was varied to allow it to offer the SwapClear service in Australia, LCH.C Ltd agreed that it would not permit Australian clearing participants to offer client clearing services until the Bank and ASIC had conducted due diligence. Among other things, LCH.C Ltd provided legal analysis regarding its ability to enact its default rules as they relate to client clearing in the event of a default of an Australian clearing participant. This work has been finalised and Australian clearing participants are now able to offer client clearing services, subject to internal risk governance approval from LCH.C Ltd. This has now been granted to one Australian clearing participant, which began client clearing in November 2015.

Regulatory priority. LCH.C Ltd began to implement client clearing in Australia in November 2015. LCH.C Ltd is encouraged to continue its dialogue with the Bank on its broader client clearing arrangements, including its approach to monitoring risks from tiered participation and its ongoing testing and review of arrangements to support the porting of client positions in the event of a participant default.

3.6.10 Disclosure

In September 2015, LCH.C Ltd published a qualitative disclosure document that provides responses to the CPMI-IOSCO *Disclosure Framework for Financial Market Infrastructures* and describes its approach to meeting the Principles (see CCP Standard 20.5). LCH.C Ltd also intends to regularly publish risk and activity data in accordance with the CPMI-IOSCO quantitative disclosure standards for CCPs, with its first publication by 1 January 2016, in line with the BoE's expectations.

Regulatory priority. LCH.C Ltd should carry out its plans to regularly publish risk and activity data in accordance with the CPMI-IOSCO quantitative disclosure standards for CCPs. In addition, the Bank will discuss with LCH.C Ltd the development of additional disclosures to assist participants in understanding their contingent exposure to the use of loss allocation tools. The Bank will also discuss with LCH.C Ltd the adequacy of its disclosure of investment risks to participants in light of its arrangements to allocate investment losses in excess of €15 million to participants.

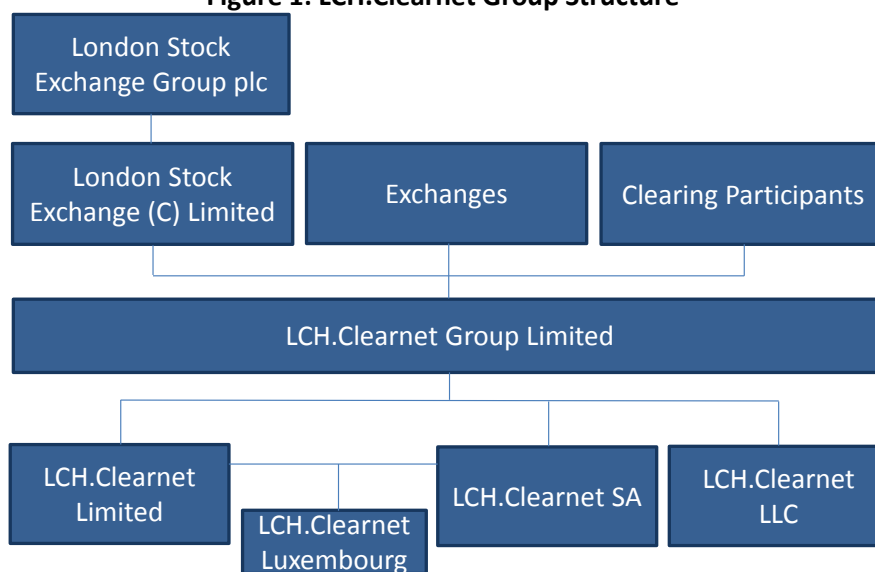
Appendix A: Governance Structures

LCH.Clearnet Group Structure

LCH.Clearnet Limited (LCH.C Ltd) is a wholly owned subsidiary of LCH.Clearnet Group Limited (LCH.C Group) (Figure 1). LCH.C Group is 57.8 per cent owned by the London Stock Exchange (C) Limited, a wholly owned subsidiary of London Stock Exchange Group plc (LSEG); 9.3 per cent owned by exchanges; and 32.9 per cent owned by clearing participants.

The LCH.C Group is a holding company incorporated in the United Kingdom. In addition to LCH.C Ltd, the LCH.C Group has two other wholly owned subsidiaries that operate central clearing services: LCH.Clearnet SA (LCH.C SA) and LCH.Clearnet LLC (LCH.C LLC). The three central counterparties (CCPs) are legally separate entities. LCH.C Ltd and LCH.C SA jointly own LCH.Clearnet Luxembourg, which holds intellectual property licences used by CCPs in the LCH.C Group.

Figure 1: LCH.Clearnet Group Structure

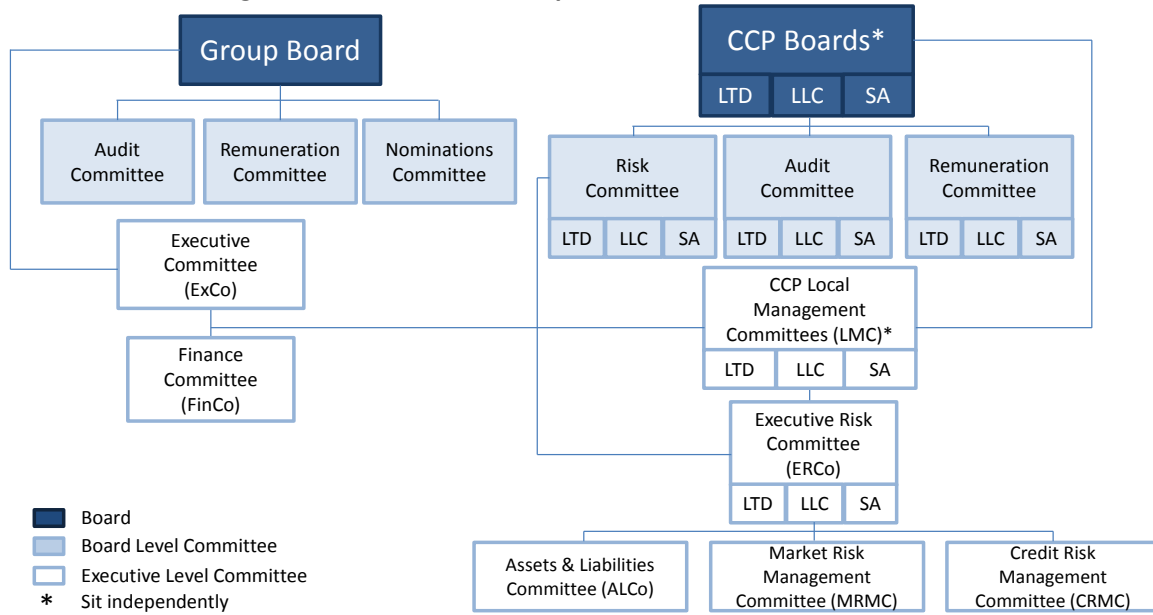


Source: LCH.C Ltd

LCH.C Group and LCH.C Ltd Governance Arrangements

LCH.C Group and LCH.C Ltd (as well as the other LCH.C Group CCPs) have independent governance structures, including their own boards, board-level committees and executive-level committees (Figure 2).

Figure 2: LCH.Clearnet Group Board and Committee Structure



Although LCH.C Ltd, LCH.C Group and the other LCH.C CCPs each operate under independent governance arrangements, there is close coordination between each entity. To promote consistency and to avoid duplication, a number of the CCP and LCH.C Group board-level and executive-level committees have overlapping memberships and routinely sit together. Many of the key policies that govern LCH.C Ltd’s operations – such as the Financial Resources Adequacy Policy, the Collateral Risk Policy and the Operational Risk Policy – are Group policies. Group policies are developed by LCH.C Group and the LCH.C CCPs in coordination, and are intended to apply across each of the CCPs. LCH.C Group policies must be approved by the LCH.C Ltd Board to be applicable to LCH.C Ltd. LCH.C Ltd also coordinates closely with LCH.C Group and the other LCH.C CCPs in day-to-day processes; some processes, such as the assignment of internal credit scores and model validations are performed at the LCH.C Group level, rather than the individual CCP level (see *Financial Stability Standards for Central Counterparties* 2.6 and 4.2).

LCH.C Group and LCH.C Ltd Boards

The LCH.C Group Board is responsible for the overall management and strategic direction of the LCH.C Group. The LCH.C Group Board has 17 members, including four independent directors. The LCH.C Group Board meets at least five times a year and on an ad hoc basis, as required. Four members of the LCH.C Group Board, including two of the independent directors and the Chief Executive Officer (CEO) of the LCH.C Group, also sit on the LCH.C Ltd Board.

The LCH.C Ltd Board has ultimate responsibility for LCH.C Ltd. This includes responsibility for: establishing clear objectives and strategies; establishing and overseeing the risk management function; ensuring compliance with legal, regulatory and contractual responsibilities; overseeing the compliance and internal control functions; and monitoring LCH.C Ltd senior management (see CCP Standard 2.3). Where there is overlap in the matters reserved for the LCH.C Group and LCH.C Ltd Boards, the LCH.C Ltd Board is not bound by decisions made by the LCH.C Group Board. However, the LCH.C Ltd Board is required to consider any views expressed by the LCH.C Group Board when making decisions on recommendation from the LCH.C Ltd Risk Committee. The LCH.C Ltd Board has 12 directors, including five independent directors, the CEOs of LCH.C Group and LCH.C Ltd, the LCH.C Group Chief Risk Officer (CRO), and one director from the LSEG Board.

Group-level, board-level and executive-level committees

The three LCH.C Group CCPs have identical board-level and executive-level committee structures (Figure 2). With the exception of the Local Management Committees (LMCs), these committees have overlapping (although not identical) memberships and routinely sit together. This facilitates cooperation and coordination across the CCPs and reduces repetition. The CCPs' Audit and Remuneration Committees also sit together with the equivalent Group-level committees. Issues specific to a particular CCP can be considered at combined meetings.

Key LCH.C Group and LCH.C Ltd board-level and executive-level committees include:

- *The LCH.C Ltd Risk Committee.* The LCH.C Ltd Risk Committee is responsible for considering and commenting on all aspects of LCH.C Ltd's risk appetite, tolerance and strategy, and assisting the LCH.C Ltd Board to fulfil its responsibility for the oversight of risk management of LCH.C Ltd (see CCP Standard 2.6). The Terms of Reference for the Risk Committee of each of the LCH.C Group CCPs requires that the Committee consider proposals for harmonisation of policies or procedures between the LCH.C Group CCPs.
- *The Group Executive Committee.* The LCH.C Group Executive Committee (ExCo) is the most senior LCH.C Group management committee. ExCo is an advisory body, which provides advice and recommendations to the Group CEO and the CEOs of the Group's CCPs. ExCo is made up of: the Group CEO, who acts as the Chairman; the CEOs of each of the Group CCPs, the business line heads and the Group functional heads; and the Group Head of Collateral and Liquidity Management (CaLM).
- *Local Management Committees.* Each of the Group CCPs has a LMC. Unlike the board-level committees and other executive-level committees, the LMCs do not sit jointly. This allows the LCH.C Ltd LMC to consider issues from the perspective of LCH.C Ltd in isolation. The LCH.C Ltd LMC provides support and advice to the LCH.C Ltd Board on risk management, strategy, financial management and reporting, operational management, audit, and governance. The LCH.C Ltd LMC reports directly to the LCH.C Ltd Board and provides direction and oversight to the LCH.C Ltd Executive Risk Committee (ERCo). Permanent members of the LCH.C Ltd LMC include: the LCH.C Ltd CEO, Chief of Staff, CRO, Chief Financial Officer, Chief Compliance Officer, Chief Technology Officer, General Counsel, Head of Operations and Human Resources (HR) director; the Heads of SwapClear, ForexClear, Equities, Fixed Income and Commodities; and the LCH.C Group Head of Technology and Operations and Head of CaLM. LMC members are allowed to nominate delegates to attend in their place.
- *Executive Risk Committees.* Each of the Group CCPs, including LCH.C Ltd, has an ERCo. The ERCOs have overlapping membership, meet concurrently and are chaired by the Group CRO. Each ERCo

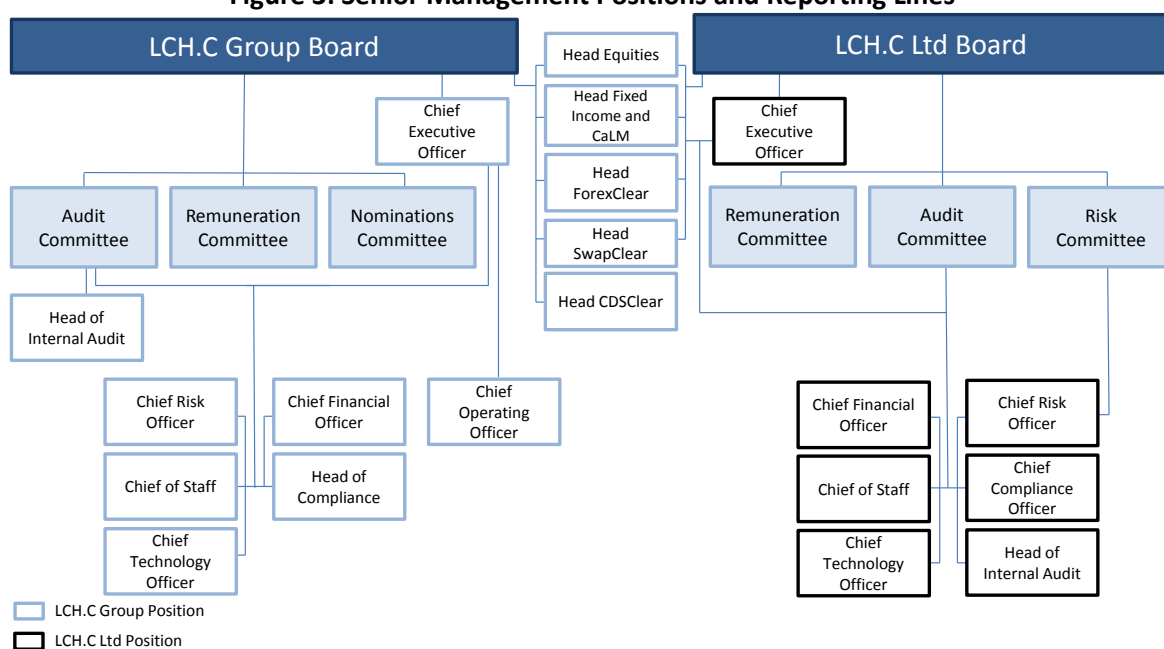
is responsible for the management, monitoring and oversight of all material risks faced by the LCH.C CCPs. The LCH.C Ltd ERCo reports directly to the LCH.C Ltd Risk Committee and the LCH.C Ltd LMC.

- *Other key committees.* Various committees support decision making within LCH.C Ltd. These include (among others), at a Group level, the Asset and Liability Committee, Market Risk Management Committee (MRMC), Credit Risk Management Committee (CRMC), Project Steering Committee, Cyber Security and Continuity Committee and the New Product Approval Committee; and at a CCP level, the Change Management Committee and Rule Change Committee. The roles of each of these committees are discussed further throughout Appendix B.

Senior management

LCH.C Group and each of the LCH.C CCPs have similar senior management structures and reporting lines (Figure 3). The roles and responsibilities of key senior management positions at the LCH.C Group and CCP-level are set out in a ‘Delegated Authorities’ document, available on LCH.C Group’s website (see also CCP Standard 2.5). In 2015, LCH.C Group appointed a new Group Chief Operating Officer (COO) who is responsible for the Group’s global product and business development activities across LCH.C Group and each of the LCH.C CCPs.³⁰ The Group COO works with the CEOs of LCH.C Ltd, LCH.C SA and LCH.C LLC, the Group CRO and other corporate functions, to obtain the relevant board approval for new strategies. However, the CEOs of each LCH.C CCP retain the right to veto the launch of any new products or product enhancements, if they do not feel that the initiative can be managed within agreed risk appetites.

Figure 3: Senior Management Positions and Reporting Lines



³⁰ In October 2015, the London Stock Exchange Group (LSEG) announced that, Michael Davie, previously the LCH.C Group COO, would become the LSEG Head of Rates Services and serve as the Chairman of CurveGlobal. As at November 2015, the business heads who previously reported to the LCH.C Group COO report to the LCH.C Group CEO.

Departments

LCH.C Ltd is organised into departments based on its core functions and the products it offers. The 'functional' departments include: Audit, CaLM, Compliance, Finance, HR, Information Technology, Legal, Operations and Risk. The various departments are further divided by function; for example, the Risk department includes, among others, teams with responsibility for credit risk, default management, reporting, collateral and liquidity risk, as well as several product-specific risk teams which operate as a second line of defence to the first line risk functions operated by each business. The separation of duties between first and second line risk management is expanded upon in CCP Standard 16.1. The CaLM function is responsible for ensuring investment activities are conducted in accordance with the relevant Group risk policies and regulations and is separate to the Collateral and Risk Management function, which is responsible for monitoring and assessing various risks against Group Risk policies. 'Product' departments are structured around LCH.C Ltd's various clearing services and include the SwapClear business unit.

Governance of SwapClear

The SwapClear service is offered by both LCH.C Ltd and LCH.C LLC. The LCH.C Ltd and LCH.C LLC SwapClear services are legally separate, such that the responsibility for the LCH.C Ltd SwapClear service remains with LCH.C Ltd. Each also maintains a separate default waterfall.

Nevertheless, there is significant coordination across the entities and LCH.C Group seeks to keep the two services as similar as possible. The Head of SwapClear, a Group-level position, is responsible for developing and managing the SwapClear service, and has the authority to develop and implement business strategy, operational plans, policies and budgets for SwapClear. The Head of SwapClear reports directly to the LCH.C Group, LCH.C Ltd and LCH.C LLC Boards as well as the CEO of LCH.C Ltd. LCH.C Ltd also maintains regional representation for SwapClear in Australia. The Head of SwapClear Australia, who reports directly to the Head of SwapClear, is responsible for overseeing the strategy and business operations of the SwapClear service in Australia.

SwapClear operates as a distinct business unit within LCH.C Ltd, although it is not a separate legal entity. SwapClear has its own executive management team overseeing its operations and has a dedicated team that performs risk management functions consistent with policies set at the LCH.C Ltd and LCH.C Group levels. The SwapClear risk management team's responsibilities include determining stress test scenarios and sizing the SwapClear default fund, pricing positions and calling variation margin, calling additional margin, determining and performing backtesting for initial margin, and determining SwapClear default management protocols. The head of the SwapClear risk team reports to the MRMC and CRMC, both of which report to the LCH.C Ltd ERCo. The Group level risk department performs the second line of defence including the maintenance of risk policies aligned to the Board's risk appetite, analysis of margin and default fund adequacy and methodologies, risk aggregation and reporting, default management coordination, determination and monitoring of internal credit scores and monitoring of credit risk related limits, new product approvals and the risk governance process.

Appendix B: Detailed Assessment of LCH.Clearnet Limited's SwapClear Service against the Financial Stability Standards

The *Financial Stability Standards for Central Counterparties* (CCP Standards) are made up of 21 headline standards, each of which is accompanied by a number of more detailed sub-standards. In assessing a facility against each of the CCP Standards, the Reserve Bank (the Bank) takes into account associated guidance.³¹ This Appendix provides details of how LCH.Clearnet Ltd's (LCH.C Ltd's) SwapClear service observes the requirements under each of the CCP Standards (including sub-standards). It also identifies regulatory priorities for LCH.C Ltd to address to enhance its observance of the requirements under particular CCP Standards.

Standard 1: Legal basis

A central counterparty should have a well-founded, clear, transparent and enforceable legal basis for each material aspect of its activities in all relevant jurisdictions.

LCH.C Ltd is a separate legal entity within LCH.Clearnet Group Limited (LCH.C Group), that solely provides central counterparty (CCP) clearing services (CCP Standard 1.1). LCH.C Ltd's legal basis is founded on rules that operate within the framework of relevant laws and regulations (CCP Standards 1.2, 1.3). LCH.C Ltd publishes key information about its regulatory status on its website and in its annual report, and has provided the Bank with certain legal opinions regarding its legal basis (CCP Standard 1.4). The LCH.C Ltd Rulebook and Clearing Membership Agreement are governed by English law and form the legal basis for LCH.C Ltd's operations (CCP Standard 1.5). The LCH.C Ltd Futures Commission Merchant (FCM) Rulebook is governed by New York law. LCH.C Ltd obtains legal opinions for all jurisdictions in which participants are incorporated, to assess the legal risk presented by these participants and whether the laws of those jurisdictions would present conflicts of law issues (see CCP Standard 1.6).

1.1 A central counterparty should be a legal entity which is separate from other entities that may expose it to risks unrelated to those arising from its function as a central counterparty.

LCH.C Ltd is a wholly owned subsidiary of LCH.C Group, a private company, limited by shares, incorporated in the United Kingdom (UK). LCH.C Group is 57.8 per cent owned by the London Stock Exchange (C) Limited, a wholly owned subsidiary of London Stock Exchange Group plc (LSEG), and 42.2 per cent owned by clearing participants and other exchanges.

The LCH.C Group has two other wholly-owned subsidiaries that operate clearing services: LCH.Clearnet SA (LCH.C SA) and LCH.Clearnet LLC (LCH.C LLC). The three CCPs are legally separate

³¹ The guidance is available at <<http://www.rba.gov.au/payments-system/clearing-settlement/standards/central-counterparties/2012/index.html>>.

entities, each with separate financial resources.³² LCH.C Ltd's activities are also separate to those of LSEG. Nonetheless, LSEG has announced that it intends to launch a 'shared service company' (SSC) which will provide shared technology and support services across all LSEG entities, including LCH.C Ltd.

LCH.C Ltd acts as a CCP for a number of exchange-traded and over-the-counter (OTC) products. LCH.C Ltd provides clearing services for two UK derivatives trading platforms and a number of equities trading platforms.³³ In OTC markets, LCH.C Ltd offers CCP services for interest rate swaps through its SwapClear service, purchase and repurchase agreements for European government and supranational bonds through RepoClear, non-deliverable foreign exchange forwards through ForexClear, and cash-settled OTC freight forwards through EnClear.

LCH.C Ltd's services are limited to CCP clearing of exchange-traded products and OTC derivatives, in accordance with the LCH.C Ltd Rulebook. Accordingly, LCH.C Ltd does not provide any services that have a distinct risk profile from, or pose additional risks to, its activity of operating a CCP.

1.2 The legal basis should provide a high degree of certainty for each material aspect of a central counterparty's activities in all relevant jurisdictions.

Legal basis

LCH.C Ltd novates contracts accepted for clearing and nets obligations across each clearing participant's open contracts.³⁴ These activities require a high degree of legal certainty to ensure they will be effective, even in a default scenario. Key components of the legal basis under which LCH.C Ltd operates are set out below.

LCH.C Ltd is primarily regulated by the Bank of England (BoE) as a 'recognised central counterparty'. This designation arises from the UK *Financial Services and Markets Act 2000*, and 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).³⁵ EMIR and its associated technical standards largely implement the Principles within the Committee on Payments and Market Infrastructures (CPMI) and International Organization of Securities Commissions (IOSCO) *Principles for Financial Market Infrastructures* (the Principles) in the European Union (EU).³⁶

LCH.C Ltd's operations span several jurisdictions. LCH.C Ltd is also registered as a Derivatives Clearing Organization (DCO) under the United States (US) Commodity Exchange Act, and therefore it and its provision of the SwapClear service (as well as the ForexClear service) are directly regulated by the US Commodity Futures Trading Commission (CFTC). Outside the EU and US, LCH.C Ltd has been formally licensed to offer clearing services or granted an exemption from regulation in the Canadian provinces of Ontario and Quebec, Japan, Norway, Singapore and Switzerland, as well as Australia.

32 As discussed in Appendix A, the SwapClear service is also offered by LCH.C LLC. Nonetheless, as noted here, LCH.C Ltd and LCH.C LLC are legally distinct, and maintain separate default resources. This Assessment focusses on LCH.C Ltd, as the entity that is licensed to provide CS facility services in Australia.

33 LCH.C Ltd is also licensed to provide clearing services in Australia for the Financial and Energy Exchange (FEX) market, to be operated by FEX Global Pty Ltd.

34 The SwapClear service operates on a novated basis. Certain other LCH.C Ltd services operate on an 'open offer' model, under which contracts are created directly with LCH.C Ltd upon trade execution.

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

36 Prior to 1 September 2014, CPMI was known as the Committee on Payment and Settlement Systems (CPSS).

In Australia, LCH.C Ltd holds a clearing and settlement (CS) facility licence, under Part 7.3 of the *Corporations Act 2001*. This licence is administered by the Australian Securities and Investments Commission (ASIC) in consultation with the Bank, with the Minister acting as the ultimate decision-maker on licensing matters. LCH.C Ltd's licence permits it to clear OTC interest rate derivatives (IRDs) and inflation rate derivatives through the SwapClear service, as well as certain products traded on the Financial and Energy Exchange (FEX) market to be operated by FEX Global Pty Ltd.

The Protected Payments System (PPS) operated by LCH.C Ltd (the system that provides for cash settlement of margins and other payments between LCH.C Ltd and its clearing participants; see CCP Standards 8 and 9) is regulated and overseen by the BoE as a 'recognised payment system' under the UK *Banking Act 2009*. The BoE requires LCH.C Ltd to operate this system having regard to the Principles.

The LCH.C Ltd Rulebook, which consists of general regulations, default rules, settlement finality regulations and various procedures, is governed by English law. The Rulebook was extensively updated in 2014 as part of LCH.C Ltd's reauthorisation under EMIR. LCH.C Ltd maintains a separate FCM Rulebook for its US-domiciled clearing participants, which includes a set of regulations, procedures and default rules (see CCP Standard 17.2).³⁷ The FCM Rulebook is governed by New York law.

All clearing participants must enter into a Clearing Membership Agreement with LCH.C Ltd. The Clearing Membership Agreement is a contract between LCH.C Ltd and the participant, governed by English law, that requires a participant to comply with the terms of the relevant LCH.C Ltd Rulebook. Accordingly, relevant contractual rights and obligations between LCH.C Ltd and its participants are contained in the LCH.C Ltd Rulebook. LCH.C Ltd has stated that its Rulebook covers all material aspects of SwapClear's activities, and aims to provide a clear and certain legal basis for its operations.

Rights and interests

The rules governing the rights and actions of LCH.C Ltd and its clearing participants in the event of a clearing participant default are set out in the LCH.C Ltd Rulebook (see CCP Standard 12). The LCH.C Ltd Rulebook, together with separate security agreements entered into by clearing participants (see below), defines the rights and interests of LCH.C Ltd, its direct clearing participants and its direct participants' clients in respect of clearing positions and associated collateral. The relationships between direct participants and their clients are governed by bilateral client clearing documentation.

At the time of licensing, LCH.C Ltd provided an English legal opinion to the Bank to the effect that where cash margin is paid to LCH.C Ltd, title in such cash passes to LCH.C Ltd upon receipt by LCH.C Ltd in accordance with the terms of the LCH.C Ltd Rulebook. At the time of licensing, LCH.C Ltd provided the Bank with an Australian legal analysis stating that an Australian court would give effect to the provisions relating to this transfer provided that the relevant provisions are legal, valid and enforceable under English law.

³⁷ The rest of this standard relates to the LCH.C Ltd Rulebook, which governs the rights and responsibilities of LCH.C Ltd's Australian clearing participants. LCH.C Ltd has advised the Bank that the LCH.C Ltd Rulebook and FCM Rulebook are broadly the same in respect of the SwapClear rules and procedures that require a high degree of legal certainty, for example, with respect to settlement finality, default rules and procedures, netting arrangements and the porting of client positions in the event of a clearing participant default. One exception is the enforcement of collateral, which LCH.C Ltd has indicated that it would pursue under New York law, instead of English law, in the event of a SwapClear FCM default.

For non-cash collateral, LCH.C Ltd's clearing participants are required to grant security to LCH.C Ltd pursuant to a deed of charge between LCH.C Ltd and the clearing participant (Charge Agreement) (see CCP Standard 15.2). LCH.C Ltd's Charge Agreements are governed by English law. LCH.C Ltd seeks a legal opinion, from a lawyer based in each relevant jurisdiction, on the capacity of participants in that jurisdiction to grant security pursuant to the Charge Agreement; this includes seeking opinions under English law.³⁸ LCH.C Ltd has provided the Bank with the relevant legal opinion obtained in Australia, which specifies that an Australian court would recognise LCH.C Ltd's security interest in collateral provided by Australian clearing participants, provided LCH.C Ltd's security interest was also valid under English law.³⁹

LCH.C Ltd relies upon contractual arrangements with custodians and central securities depositories (CSDs). LCH.C Ltd has advised the Bank that prior to entering into an arrangement with a custodian or CSD, it conducts due diligence to ensure that the assets belonging to LCH.C Ltd or its clearing members are fully segregated, identifiable and accessible promptly in the event of a clearing participant default (see CCP Standard 15.2). As part of the due diligence process, LCH.C Ltd must also be satisfied that assets belonging to LCH.C Ltd are fully segregated, identifiable and accessible promptly in the event that the custodian or CSD defaults (see CCP Standard 15.2). Due diligence reviews are conducted at least every two years, and LCH.C Ltd has the ability to initiate ad hoc reviews when necessary. When conducting due diligence on a non-UK domiciled custodian or CSD, LCH.C Ltd will also seek legal advice for that jurisdiction.

1.3 A central counterparty should have rules, procedures and contracts that are clear, understandable and consistent with relevant laws and regulations.

To facilitate an understanding of the risks that current and prospective clearing participants may face by participating in the SwapClear service, the LCH.C Ltd Rulebook is available on the LCH.C Group website (see CCP Standard 20.1). The LCH.C Ltd Rulebook sets out the procedures, timings, contract terms and other details of the SwapClear service.

The LCH.C Ltd Rulebook is supplemented with explanatory material, published on the LCH.C Group and SwapClear websites and the LCH.C Ltd restricted clearing participant website, to support participants' (and prospective participants') understanding of the risks they face through participation in the SwapClear service. Publicly available material includes high-level descriptions of LCH.C Ltd's risk management framework, margining methodology, business continuity arrangements and default management process (DMP) (see CCP Standard 20.1).

The LCH.C Ltd Rule Change Committee oversees all amendments to the LCH.C Ltd Rulebooks. Material changes to the LCH.C Ltd Rulebook must be unanimously approved by the Rule Change Committee before being effected. The Committee comprises the LCH.C Ltd Head of Legal, LCH.C Ltd Chief Compliance Officer (CCO), another representative of each of the Compliance and Legal departments, and another LCH.C Ltd representative (as nominated by the LCH.C Ltd Chief Executive Officer (CEO)). The Rule Change Committee has the ability to make non-material amendments to the LCH.C Ltd

38 These opinions, which also cover a range of other issues (see CCP Standard 1.5), are made available on the LCH.C Group website at <<http://www.lchclearnet.com/members-clients/members/fees-ltd/annual-account-structure-fees>>.

39 The relevant legal opinion also recommended that LCH.C Ltd register its security interests under the Charge Agreement entered into with each Australian clearing participant in accordance with the *Personal Property Securities Act 2009* (PPSA), in order to protect the enforceability and priority of LCH.C Ltd's security interests. LCH.C Ltd has since advised the Bank that PPSA registrations have been effected for three of the four Australian clearing participants of LCH.C Ltd.

Rulebook by providing notice to affected clearing participants, unless explicit provisions stating otherwise are included in the LCH.C Ltd Rulebook or Clearing Membership Agreement.⁴⁰ If the Rule Change Committee deems a change to be material, clearing participants are consulted on the change, for a period determined by the Rule Change Committee.

Proposed changes to the LCH.C Ltd Rulebook are submitted to the BoE for approval or non-objection. Amendments to the LCH.C Ltd Rulebook that affect its DCO services must also be submitted to the CFTC, and are made publicly available on the LCH.C Group website prior to implementation.

1.4 A central counterparty should be able to articulate the legal basis for its activities to the Reserve Bank and other relevant authorities, participants and, where relevant, participants' customers, in a clear and understandable way.

LCH.C Ltd has obtained certain legal opinions regarding its legal basis. These opinions address, among other things, the efficacy of the choice of English law as the governing law of LCH.C Ltd's Rulebook, Clearing Membership Agreement and Charge Agreement, and the enforceability of those agreements, subject to certain assumptions (see CCP Standard 1.2). These opinions are made publicly available on the LCH.C Ltd website. Before offering the SwapClear service in any new jurisdiction, LCH.C Ltd obtains a legal opinion from a lawyer based in that jurisdiction regarding (amongst other things) the enforceability of the LCH.C Ltd Rulebook (see CCP Standard 1.6).

LCH.C Ltd publishes key information about its regulatory status on its website and in its annual report. The details of the relevant regulatory frameworks under which LCH.C Ltd operates, including statutory instruments and stated policies, are publicly available on the BoE and CFTC websites. The LCH.C Ltd Rulebook refers to supporting legislative instruments where appropriate. LCH.C Ltd's articles of association are available through Companies House, the UK company registrar.

LCH.C Group also publishes key information about the regulatory status and legal basis of LCH.C Ltd as part of its response to the CPMI-IOSCO *Disclosure Framework for Financial Market Infrastructures*, which describes LCH.C Ltd's approach to meeting the legal basis requirements of the Principles (see CCP Standard 20.5).⁴¹

During the 2014/15 Assessment period, LCH.C Ltd provided legal analysis to the Bank and ASIC in support of its permitting Australian clearing participants to offer client clearing services. Among other things, this analysis covered LCH.C Ltd's ability under Australian laws to enact its default rules, as they relate to client clearing, in the event of a default of an Australian clearing participant. In particular, these default rules provide for LCH.C Ltd to transfer a defaulting clearing participant's client's positions and collateral to a non-defaulting clearing participant or to terminate and close out those positions and return any remaining collateral to the client.

40 See Regulation 44 (Alteration of Regulations and the Procedures), LCH.C Ltd General Regulations, p. 126. Available at <<http://www.lchclearnet.com/documents/731485/762691/general+regulations+-+03.11.14.pdf>>.

41 Available at <http://www.lchclearnet.com/documents/731485/762558/CPMI_IOSCO_Assessment_of_LCH+ClearnetLtd+2014.pdf>.

1.5 A central counterparty should have rules, procedures and contracts that are enforceable in all relevant jurisdictions. There should be a high degree of certainty that actions taken by the central counterparty under such rules and procedures will not be voided, reversed or subject to stays, including in the event that the central counterparty enters into external administration or that one or more of its participants defaults or is suspended.

The LCH.C Ltd Rulebook is governed by English law. As discussed above, LCH.C Ltd requires each clearing participant to enter into a Clearing Membership Agreement, which is also governed by English law and stipulates that English courts have exclusive jurisdiction to determine any action or dispute arising in relation to the Clearing Membership Agreement (see CCP Standard 1.2). LCH.C Ltd obtains legal opinions for all jurisdictions in which participants are incorporated, to assess the legal risk presented by these participants and whether the laws of those jurisdictions would present conflict-of-laws issues (see CCP Standards 1.4 and 1.6). Measures that contribute to ensuring a high degree of certainty in respect of specific aspects of LCH.C Ltd's activities are detailed below.

Settlement finality

The Settlement Finality Regulations contained within the LCH.C Ltd Rulebook set out the conditions under which settlement obligations arising from registered exchange-traded and OTC contracts are final and irrevocable (see CCP Standard 8.1). These regulations are supported by LCH.C Ltd's designation under the UK *Financial Markets and Insolvency (Settlement Finality) Regulations 1999*, which implement *Directive 98/26/EC of the European Parliament and of the Council of 19 May 1998 on settlement finality in payment and securities settlement systems* (the Settlement Finality Directive). The Settlement Finality Directive seeks to reduce the risks associated with participation in payment and securities settlement systems, by minimising the disruption caused by insolvency proceedings brought against a clearing participant in such a system.

Netting arrangements

LCH.C Ltd has obtained a legal opinion to the effect that English law recognises the effectiveness of LCH.C Ltd's netting arrangements.⁴² In 2014, LCH.C Ltd obtained an updated legal opinion stating that an Australian court should uphold the choice of English law governing LCH.C Ltd's netting arrangements.⁴³

LCH.C Ltd has provided the Bank with a legal opinion to the effect that the *Payment System and Netting Act 1998* (PSNA) would apply in the event of the insolvency of an Australian clearing participant. LCH.C Ltd's SwapClear CS facility is approved as a 'netting market' in Australia under the PSNA.⁴⁴ LCH.C Ltd has provided the Bank with a copy of a legal opinion to the effect that the Clearing Membership Agreement should constitute a 'market netting contract' for the purposes of the PSNA and that certain rights of LCH.C Ltd under the Rulebook and Charge Agreement, including those relating to termination, novation and netting, are protected under Part 5 of the PSNA in the event of the insolvency of an Australian clearing participant. Part 5 of the PSNA covers several areas relevant to CCPs, including a CCP's rights to access a defaulting clearing participant's collateral, termination of

42 This legal opinion is available at <<http://www.lchclearnet.com/documents/731485/762833/LCH+Ltd+Legal+Opinion+Questionnaire+Response+-+England+and+Wales.pdf>>.

43 This legal opinion is available at <http://www.lchclearnet.com/documents/731485/762528/231058088_1_lch+Ltd-legal-opinion-emir-august2014-signed.pdf>.

44 LCH.C Ltd's FEX CS facility is also approved as a netting market under the PSNA.

open contracts and netting of a CCP's obligations with respect to an insolvent Australian clearing participant, in accordance with the CCP's rights under the relevant market netting contract.

Assumption of risk

LCH.C Ltd assumes the counterparty credit risk of SwapClear contracts through novation. Under the LCH.C Ltd Rulebook, novation occurs at the time the contract is registered with the CCP. LCH.C Ltd has advised the Bank that the concept and specific meaning of novation is established in English common law, and it relies on this to provide the legal basis for novation of contracts under the Rulebook.

Enforceability of rules in default

Default of participants

LCH.C Ltd has obtained an English legal opinion confirming that its default rules are enforceable as a matter of English law. The application of LCH.C Ltd's default rules and procedures to the exclusion of the UK insolvency regime is protected by a number of statutory instruments. LCH.C Ltd has shared its assessment with the Bank that it is protected by Part VII of the UK *Companies Act 1989* from general application of the UK insolvency regime. LCH.C Ltd has obtained a legal opinion that states that, as provided for under Part VII of the Companies Act, it is permitted to exercise its rights in respect of contracts registered with SwapClear consistent with its DMP, and is protected from interference, or subsequent claim, by the insolvency office holder of the defaulted party.

The UK *Financial Collateral Arrangements (No 2) Regulations 2003* seek to prevent the placing of moratoriums under UK insolvency law on the enforcement of securities which are 'financial collateral arrangements'. LCH.C Ltd has stated that it seeks to ensure that its security arrangements meet the relevant criteria for protection under these regulations.

Insolvency of LCH.C Ltd

The LCH.C Ltd Rulebook sets out contract termination and netting arrangements that apply in the event of LCH.C Ltd's insolvency; LCH.C Ltd has stated that it believes the netting provisions contained in the Rulebook would be enforceable in the event of LCH.C Ltd's insolvency. As noted above, the Rulebook is governed by English law. In addition, at the time of licensing, LCH.C Ltd provided the Bank with legal analysis stating that insolvency of LCH.C Ltd would be governed under English law. This legal analysis indicated that English law would not prohibit or render ineffective the netting arrangements provided for in the Rulebook. The Rulebook also provides for clearing participants to set off debts against LCH.C Ltd in respect of their mutual dealings with each other. LCH.C Ltd has provided legal analysis to the Bank which notes, separately, that UK insolvency law provides for mandatory set-off provisions.

The BoE, in its role as the UK resolution authority, has various powers that it could use to maintain the continuity of LCH.C Ltd's services if LCH.C Ltd was failing, or was likely to fail, and it was not reasonably likely that LCH.C Ltd's own actions would be sufficient to maintain continuity of its services. These powers are set out in the UK *Banking Act 2009* (as amended by the UK *Financial Services Act 2012*), which provides for a special resolution regime (SRR) for CCPs. The UK Treasury's Special Resolution Regime Code of Practice, published in March 2015, supports the legal framework of the SRR (see Box B). Under the SRR, the BoE would have the power to transfer some or all of the business of a CCP or its group undertaking to a commercial purchaser or to a bridge CCP owned and controlled by the BoE, and the power to transfer the ownership of the CCP to any person. The BoE

would also have the power of direction over an insolvency practitioner appointed in relation to the CCP.

- 1.6 A central counterparty conducting business in multiple jurisdictions should identify and mitigate the risks arising from any potential conflicts of law across jurisdictions. A central counterparty should provide the Reserve Bank with a legal opinion that demonstrates the enforceability of its rules and addresses relevant conflicts of law across the jurisdictions in which it operates. This should be reviewed on a periodic basis or when material changes occur that may have an impact on the opinion, and updated where appropriate.**

To minimise the legal risk that could arise from accepting non-UK domiciled clearing participants, agreements between LCH.C Ltd and its participants are governed by English law, and participants are required to submit to the jurisdiction of English courts.

LCH.C Ltd maintains a Policy for Identification of Conflicts of Law Issues. In accordance with this policy, LCH.C Ltd seeks legal opinions prior to accepting clearing participants from other jurisdictions. Among other things, these legal opinions cover the extent to which those aspects of the LCH.C Ltd Rulebook that require a high degree of legal certainty are enforceable in a clearing participant's home jurisdiction (see CCP Standard 1.5), the enforceability of LCH.C Ltd's contracts and the jurisdiction of English courts over its clearing participants.

LCH.C Ltd's Policy for Identification of Conflicts of Law Issues also requires that LCH.C Ltd refresh its legal opinions relating to cross-border clearing participants every three years. In accordance with this policy, LCH.C Ltd must also refresh its legal opinions if material changes occur to either the relevant laws of a foreign jurisdiction or the LCH.C Ltd Rulebook that could impact the outcome of its legal opinions.

To date, LCH.C Ltd has obtained legal advice for Australia, Austria, Belgium, Canada (Ontario and Quebec), Denmark, England and Wales, Finland, France, Germany, Hong Kong, Italy, Japan, Netherlands, Norway, Poland, Portugal, Scotland, Spain, Sweden, Switzerland and the US.

LCH.C Ltd has provided the Bank with the legal opinion addressing enforceability of LCH.C Ltd's Rulebook and conflicts of law issues for Australia. The advice is to the effect that, subject to certain qualifications and assumptions, no matters have been identified which would indicate that an Australian court would not uphold the provisions in the LCH.C Ltd Rulebook and any Clearing Membership Agreement that specify the governing law to be English law, and that provide for a clearing participant to submit to the jurisdiction of English courts. LCH.C Ltd updated this legal opinion following the implementation of changes to its Rulebook as part of its EMIR reauthorisation (see CCP Standard 1.2); it has informed the Bank that the revised opinion did not materially change the outcome of the opinion provided at the time of licensing.

As noted in CCP Standard 1.4, LCH.C Ltd has provided legal analysis to the Bank and ASIC that covers its ability under Australian laws to enact its default rules as they relate to client clearing in the event of a default of an Australian clearing participant.

Standard 2: Governance

A central counterparty should have governance arrangements that are clear and transparent, promote the safety of the central counterparty, and support the stability of the broader financial system, other relevant public interest considerations and the objectives of relevant stakeholders.

LCH.C Ltd has objectives that prioritise the safety of the CCP (CCP Standard 2.1). LCH.C Ltd's governance arrangements are documented and publicly disclosed. These arrangements establish direct lines of responsibility and accountability, and also include procedures to identify, address and manage member conflicts of interest. The performance of the LCH.C Ltd Board and its individual board members is reviewed at least annually (CCP Standards 2.2, 2.3). Membership of the LCH.C Ltd Board includes independent non-executive directors, and the LCH.C Ltd Board has implemented processes that seek to ensure that its membership has appropriate skills and incentives (CCP Standard 2.4). LCH.C Ltd has documented the roles and responsibilities of senior management. Remuneration is determined according to the LCH.C Ltd Remuneration Policy, and is structured to provide incentives for sound and effective risk management (CCP Standard 2.5). LCH.C Ltd has a documented risk management framework that is reviewed at least annually by the Audit Committee and endorsed by the board-level Risk Committee and LCH.C Ltd Board (CCP Standard 2.6). Key processes and internal control systems are subject to review by LCH.C Ltd's Internal Audit department, which itself is subject to periodic external independent reviews (CCP Standard 2.7). LCH.C Ltd has sought to establish governance arrangements that allow it to take account of the interests of its direct and indirect participants and other relevant stakeholders. Governance arrangements also provide for consultation and stakeholder engagement through appropriate forums. LCH.C Ltd discloses material decisions to stakeholders, and where relevant, the public (CCP Standard 2.8). LCH.C Ltd's formal governance structure is independent of the LCH.C Group, LCH.C SA and LCH.C LLC, in order to address potential conflicts of interest that may arise as a result of its group structure (CCP Standard 2.9).

2.1 A central counterparty should have objectives that place a high priority on the safety of the central counterparty and explicitly support the stability of the financial system and other relevant public interest considerations.

The objectives of LCH.C Ltd are publicly available on the LCH.C Group website, and in LCH.C Ltd's financial statements. LCH.C Ltd's objectives include, among other things, the reduction of risk and safeguarding of the financial infrastructure in the markets it serves. LCH.C Ltd assesses its performance against its objectives at both board level and executive level through regular business, risk management and performance reviews. The LCH.C Ltd Board has adopted a Risk Governance Framework, setting out the risks LCH.C Ltd faces, its tolerances for these risks, the personnel responsible for each risk and the associated reporting requirements (see CCP Standard 2.6).

LCH.C Ltd's governance arrangements provide for input by participants, participants' clients, and other stakeholders, in various governance bodies and consultative forums (see CCP Standard 2.8). These arrangements provide for consideration by LCH.C Ltd of the interests of participants and other stakeholders.

2.2 A central counterparty should have documented governance arrangements that provide clear and direct lines of responsibility and accountability. These arrangements should be disclosed to owners, the Reserve Bank and other relevant authorities, participants and, at a more general level, the public.

LCH.C Ltd is a wholly owned subsidiary of LCH.C Group (see CCP Standard 1.1 and Appendix A). There is significant coordination in the governance of the LCH.C Group and the three group CCPs, including LCH.C Ltd; however, the LCH.C Ltd Board has ultimate responsibility for LCH.C Ltd. The SwapClear service operates as a business unit within LCH.C Ltd (see Appendix A).

The governance arrangements of LCH.C Ltd are documented on the LCH.C Group website. This documentation includes the composition of the Board and board-level committees, the Schedule of

Matters Reserved for the Board, the terms of reference for board-level committees, and Delegated Authorities. Profiles of all directors are publicly available on the LCH.C Group website.

As set out in the Schedule of Matters Reserved for the Board, the LCH.C Ltd Board is responsible for the overall management of LCH.C Ltd and for establishing clear objectives and strategies (see CCP Standard 2.3). The Board has established an Audit Committee, Remuneration Committee and, as an advisory body, a Risk Committee. The composition and terms of reference of the committees are made available on the LCH.C Group website. The board-level committees represent the Board's interest in a number of areas:

- The Audit Committee is responsible for monitoring LCH.C Ltd's financial management, internal controls, and audit function.
- The Risk Committee considers and comments on LCH.C Ltd's risk appetite, tolerance and strategy and assists the LCH.C Ltd Board to fulfil its responsibility for the oversight of the risk management of LCH.C Ltd.
- The Remuneration Committee is responsible for determining the Board's remuneration policy.

The role and authority of key senior management positions are set out in the Delegated Authorities document (see CCP Standard 2.5).

2.3 The roles and responsibilities of a central counterparty's board of directors (or equivalent) should be clearly specified, and there should be documented procedures for its functioning, including procedures to identify, address and manage member conflicts of interest. The board should regularly review both its overall performance and the performance of its individual board members.

The roles and responsibilities of the LCH.C Ltd Board are set out in the Schedule of Matters Reserved for the Board, the Articles of Association and the Delegated Authorities document. More general procedures relating to the functioning of the LCH.C Ltd Board are set out in these documents, as relevant. The LCH.C Ltd Board meets at least five times a year, and on an ad hoc basis as required.

Broadly, the LCH.C Ltd Board is responsible for:

- establishment of clear objectives and strategies
- monitoring LCH.C Ltd's senior management
- establishing appropriate remuneration policies
- establishing and overseeing the risk management function
- overseeing the compliance and internal control functions
- ensuring compliance with legal, regulatory and contractual responsibilities
- overseeing outsourcing arrangements
- providing accountability to shareholders, employees, clearing participants, clients and other stakeholders.

Consistent with the Articles of Association and Group Conflicts of Interest and Duty Policy, Board members must disclose any actual or potential conflicts of interest. A conflicted member will be excluded from relevant parts of a Board meeting and any vote or resolution relating to a matter in which that member has a conflict of interest, and will not be entitled to receive any information

relating to the matter. A majority of the independent directors, in consultation with the CCO, can give consent for a conflicted member to participate. Where there is a question as to whether an actual or potential conflict of interest exists, the matter will be determined by the independent directors, in consultation with the CCO.

The LCH.C Ltd Board undertakes an annual review of its own performance and that of its committees. The review takes the form of an annual survey of the non-executive directors and considers the effectiveness of the Board and its members, the Chairman, and the Board's processes, behaviour and culture. Results of the survey are formally fed back to the Board in a minuted session. The LCH.C Ltd Board is not subject to independent review.

2.4 The board should comprise suitable members with the appropriate skills and incentives to fulfil its multiple roles. This typically requires the inclusion of non-executive board member(s).

The LCH.C Ltd Board has 12 directors, including: four independent non-executive directors; one LSEG director; two representatives of members (currently one vacancy) and one representative of a venue (i.e. exchanges or trading venues); the CEOs of LCH.C Group and LCH.C Ltd; and the LCH.C Group Chief Risk Officer (CRO); as well as the Board's Chairman, who is also considered to be independent and is also the Chairman of the LCH.C Group Board. There is some overlap in membership between the LCH.C Ltd Board and the LCH.C Group, LCH.C LLC and LCH.C SA Boards: of the five independent members, three (including the Chairman) sit on all four Boards.

Appointments to the LCH.C Ltd Board are made by the Board, on advice from the LCH.C Group Nominations Committee. When nominating a candidate, the Nominations Committee must be satisfied that the candidate understands the responsibilities of Board membership and will devote the necessary time to the position. The Committee must also ensure that any candidate is respected for their competence and is of good standing in their field of business. A profile of each director and their relevant experience is made available on the LCH.C Group website.

The Nominations Committee's terms of reference set out how independent directors are appointed, including the definition of 'independence'. In particular, the Nominations Committee considers a director to be independent if the individual is independent in character and judgement, and has no relationships or circumstances (including with LSEG or any of its subsidiary undertakings and/or with any significant user or venue shareholder) that are likely to affect, or could appear to affect, the prospective director's judgement. Independent directors are interviewed by the BoE prior to appointment, and their independence is reviewed by the Nominations Committee at least annually. LCH.C Ltd publicly discloses which of its directors it regards as independent. When making decisions on recommendations in relation to the appointment of an independent director, the Nominations Committee will take into account that ideally among the independent directors there should be:

- a breadth of industry expertise and experience and product knowledge
- particular expertise and experience in risk management, audit, clearing services and financial services
- representation of the geographical spread of the Group's business
- diversity, including gender, age, geographical provenance and educational and professional background.

Independent directors receive a fixed fee that is determined by the Board (excluding the independent directors) and is not linked to the business performance of LCH.C Ltd. Fees are reviewed annually. Other directors do not receive a fee.

The Nominations Committee terms of reference provide that independent directors should have a maximum tenure of three three-year terms. However, the term of an independent director may be extended to ensure that not all independent directors' appointments terminate at the same time. User directors are appointed for one three-year term. All other directors are subject to re-election every three years.

The structure, size and composition of the LCH.C Ltd Board are reviewed regularly by the Nominations Committee. Recommendations are made to the Board if any changes are considered necessary or desirable. It is the responsibility of the LCH.C Ltd Board, in consultation with Nominations Committee, to perform adequate succession planning for Board positions.

2.5 The roles and responsibilities of management should be clearly specified. A central counterparty's management should have the appropriate experience, mix of skills and integrity necessary to effectively discharge its responsibilities for the operation and risk management of the central counterparty. Compensation arrangements should be structured in such a way as to promote the soundness and effectiveness of risk management.

LCH.C Ltd has established direct reporting lines between senior management and the boards (see Appendix A). The LCH.C Ltd CEO is responsible for managing LCH.C Ltd and may make decisions on all matters affecting the operation, performance and strategy of LCH.C Ltd, with the exception of matters reserved specifically for the LCH.C Ltd Board. The CEO of LCH.C Ltd reports directly to the LCH.C Ltd Board. As discussed in Appendix A, the Head of SwapClear also has a direct reporting line to the LCH.C Ltd Board.

Other key LCH.C Ltd senior managers with responsibility for control or finance functions – the CRO, Chief of Staff (COS), Chief Technology Officer (CTO), Chief Financial Officer (CFO), Chief Compliance Officer (CCO) and Head of Internal Audit – have direct reporting lines to the board-level Audit Committee. The CRO also reports directly to the board-level Risk Committee.

The role and authority of key senior management positions are set out in the Delegated Authorities document (see Appendix A). All senior management are responsible for: ensuring consistency of LCH.C Ltd's activities with the objectives and strategy of LCH.C Ltd, as determined by the Board; designing and establishing compliance and internal control procedures that promote LCH.C Ltd's objectives; subjecting the internal control procedures to regular review and testing; ensuring sufficient resources are devoted to risk management and compliance; being actively involved in the risk control process; and ensuring that risks posed to LCH.C Ltd by its clearing activities and activities linked to clearing are addressed.

LCH.C Ltd has formal procedures for filling senior management positions to ensure management has the appropriate experience and mix of skills. LCH.C Ltd has a talent management process in place, covering talent acquisition, succession planning and key person risk assessments. Risks identified in the key person risk assessment are managed through various initiatives. Senior management are also interviewed by the BoE prior to appointment. Senior management are subject to annual performance reviews, including assessment against their objectives and core competencies.

Remuneration policies are determined by the LCH.C Ltd Board on recommendation from the LCH.C Ltd Remuneration Committee. When determining remuneration policies, the Remuneration Committee terms of reference requires that:

- policies are aligned with the LCH.C Ltd risk tolerance and corporate strategy
- members of executive management and employees of LCH.C Ltd are provided with the appropriate incentives to encourage enhanced performance, with a particular focus on risk management as the core purpose of LCH.C Ltd
- employees and members of the executive management are, in a fair and responsible manner, rewarded for their individual contributions to the success of LCH.C Ltd.

Under the LCH.C Ltd Remuneration Policy, remuneration for employees in control functions (Internal Audit, Risk and Compliance) is determined by the relevant Division head and CEO, and is subject to separate review by the LCH.C Ltd Remuneration Committee. To avoid the creation of adverse incentives, bonuses for employees in control functions are set independently of the business performance of LCH.C Ltd. Although the overall performance of LCH.C Ltd may be a contributing factor in determining the total bonus pools, the primary factor in determining individual rewards for employees in these functions is the degree to which corporate competencies and specific functional objectives have been achieved.

The Remuneration Policy is reviewed by the LCH.C Ltd Remuneration Committee and approved by the Board each year.

2.6 The board should establish a clear, documented risk management framework that includes the central counterparty's risk tolerance policy, assigns responsibilities and accountability for risk decisions, and addresses decision-making in crises and emergencies. Governance arrangements should ensure that the risk management and internal control functions have sufficient authority, independence, resources and access to the board, including through the maintenance of a separate and independent internal audit function.

LCH.C Ltd has established a Risk Governance Framework that: identifies the universe of risks to which LCH.C Ltd may be exposed; provides a framework for assessing the Board's tolerance to identified risks; designates responsibility for measuring, monitoring and actioning each risk type; and provides guidelines for risk reporting (see CCP Standard 3). The LCH.C Ltd Risk Governance Framework is owned by the LCH.C Ltd CRO, reviewed at least annually by the Audit Committee and must be endorsed annually by the LCH.C Ltd Risk Committee and the LCH.C Ltd Board.

The LCH.C Ltd Board retains overall responsibility for the establishment and oversight of risk management at LCH.C Ltd. LCH.C Ltd Board approval is required for:

- changes to the criteria for admission to clearing membership
- risk controls designed or adapted for the clearing of any new market
- changes to the default fund sizing methodology
- changes to the default fund rules
- LCH.C Ltd's Risk Governance Framework, which states the Board's Risk Appetite
- LCH.C Ltd's Financial Resource Adequacy Policy, Liquidity Risk Policy, Operational Risk Policy, Investment Risk Policy, Collateral Risk Policy, Counterparty Credit Risk Policy, Contract & Market

Acceptability Policy, Default Management Policy, Settlement Payment & Custody Risk Policy, Model Governance Validation & Review Policy and any significant changes to these policies

- LCH.C Ltd's Business Continuity Management Policy and Disaster Recovery Plan.

The LCH.C Ltd Board has established a board-level Risk Committee, responsible for considering and commenting on all aspects of LCH.C Ltd's risk appetite, tolerance and strategy. The LCH.C Ltd Risk Committee receives advice, recommendations and updates from LCH.C Ltd's Executive Risk Committee (ERCo) relating to risk policies and methodologies subject to the LCH.C Ltd ERCo's oversight and review. The LCH.C Ltd Risk Committee also reviews, on an annual basis (or more frequently if deemed necessary), LCH.C Ltd policies and considers changes to existing and new arrangements. Recommendations made by the LCH.C Ltd Risk Committee are taken to the LCH.C Ltd Board for approval and any major decisions are disclosed to relevant stakeholders and, where there is a broad market impact, the public.

The LCH.C Ltd Risk Committee currently has six voting members, including two independent LCH.C Ltd Board directors. The Committee's terms of reference require that the Chairman be an independent director and also that 35–50 per cent of voting members be independent directors. The remaining four voting members are representatives of clearing participants and clients of clearing participants. Other individuals, such as senior LCH.C Ltd, LCH.C Group and LSEG risk personnel, and risk experts representing participants who fulfil the criteria of Users (as defined in CCP Standard 2.8) may also attend meetings of the LCH.C Ltd Risk Committee in a non-voting capacity. LCH.C Ltd's Risk Committee currently has seven non-voting members. Voting rights are rotated periodically (at least once a year) among User representatives. It is the responsibility of the Chairman, Vice Chairman and Secretary of the LCH.C Ltd Risk Committee to ensure that the Committee has a suitable range of expertise to consider and evaluate the risk matters placed before it. The LCH.C Ltd Risk Committee meets at least six times a year, and typically does so more frequently.

The LCH.C Ltd CRO is responsible for the management and control of risks within LCH.C Ltd, and has the authority to develop and implement LCH.C Ltd's risk framework. The LCH.C Ltd CRO reports directly to the LCH.C Ltd CEO and make reports to the LCH.C Ltd Risk Committee and Board as necessary. The LCH.C Ltd CRO works in conjunction with the Group Head of Credit Risk, the Group Head of Market Risk and the LCH.C Ltd Head of Operational Risk to manage the risk appetite of LCH.C Ltd and ensure appropriate risk policies are defined, established and developed. Implementation of these policies typically occurs by the risk management team located within each service (see Appendix A).

LCH.C Ltd has governance arrangements in place that address decision-making in crises and emergencies, including through the establishment of a Crisis Management Team (CMT) and a Default Crisis Management Team (DCMT). Each works according to established plans and procedures, which seek to ensure that the response to and management of a crisis or default is effective and to minimise the impact on employees and participants (see CCP Standard 12.1 and CCP Standard 16.7).

The Head of Internal Audit is responsible for providing objective and independent assurances to the LCH.C Ltd Board on the effectiveness of risk management arrangements and activities across LCH.C Ltd (see CCP Standard 2.7). The Head of Internal Audit reports directly to the Chairman of the LCH.C Ltd Audit Committee. To ensure that risk management personnel have sufficient independence, remuneration of key control functions, such as internal audit, risk and compliance, is not linked to the business performance of LCH.C Ltd (see CCP Standard 2.5).

Model Validation

The LCH.C Group Model Governance, Validation and Review Policy – which applies to margin models, models used for pricing financial products guaranteed by LCH.C Ltd or received as collateral, and models used for assigning internal credit scores (ICSs; see CCP Standard 4.2) – defines the governance arrangements around the adoption, use, change and validation of models by LCH.C Ltd. The policy is reviewed by the LCH.C Ltd ERCo, and approved by the LCH.C Ltd Risk Committee and Board annually.

The model validation governance process may include: peer review by quantitative experts through the Model Working Group; approval of the Market Risk Management Committee (MRMC), or Credit Risk Management Committee (CRMC) when appropriate; independent validation of the model; approval by the LCH.C Ltd ERCo; review by the LCH.C Ltd Risk Committee; approval by the Board; and review and/or approval by the regulators, if necessary. The exact process applied to a particular model or change in model depends on the importance of the model and type of change – for example, independent model validation is required when adopting a new model or making a material change to an existing model. The Independent Model Validation Team is a team within LCH.C Group that is not involved in building or testing the model. The team reports to the Group CFO and is independent of the Group Risk function (Group Risk). The policy allows for model validation by an external party, although this is not required.⁴⁵

Model validation makes an evaluation of the conceptual and practical soundness of a particular model. Model validations cover at least the following aspects: the information provided by the model developer; the procedures for the monitoring of model performance, parameters and assumptions; and an analysis of the risks that are not covered by the model but are included in stress testing. The LCH.C Group Financial Resource Adequacy Policy specifies additional requirements for the validation of margin models. All models covered by the policy must be validated at least annually.

2.7 A central counterparty's operations, risk management processes, internal control mechanisms and accounts should be subject to internal audit and, where appropriate, periodic external independent expert review. Internal audits should be performed, at a minimum, on an annual basis. The outcome of internal audits and external reviews should be notified to the Reserve Bank and other relevant authorities.

Internal audits are performed by the LCH.C Ltd Internal Audit department. The core objective of the Internal Audit function is to assist management and the LCH.C Ltd Audit Committee to evaluate policies, control standards and associated procedures designed to manage business risk. Guidelines and principles that apply to internal audit are set out in the LCH.C Ltd Internal Audit Charter.

The internal audit department prepares an annual audit plan which sets out the timing and frequency of audits each year. The audit plan is confirmed by the LCH.C Ltd Audit Committee. The frequency of internal audits is determined through risk assessments, with higher risk areas subject to more frequent audit. The internal audit department aims to meet professional standards and benchmarks against the Institute of Internal Auditors Standards for the Professional Practice of Internal Auditing.

To preserve its independence and objectivity, Internal Audit is independent from LCH.C Ltd's business processes and it does not assume direct operating responsibilities within LCH.C Ltd, including the design or implementation of controls. Internally recruited auditors do not audit activities or functions they have performed in the recent past. The internal audit function has direct access to the LCH.C Ltd

⁴⁵ LCH.C Ltd's initial margin, backtesting and stress-testing models for inflation rate derivatives were subject to an independent external validation which was completed in December 2014.

Board and Audit Committee. The Head of Internal Audit reports directly to the Chairman of the Audit Committee. In addition, Internal Audit has a direct reporting line to the LCH.C Ltd CEO. The adequacy of the resourcing of the internal audit function is reviewed each year, following the finalisation of the internal audit plan.

As discussed in CCP Standard 2.2, the LCH.C Ltd Board has established a board-level Audit Committee. The LCH.C Ltd Audit Committee is responsible for determining whether management has put in place adequate internal control systems that provide reasonable assurance that corporate objectives will be achieved and that LCH.C Ltd complies with applicable regulatory requirements. The discussions, decisions and recommendations of the Committee are reported to the LCH.C Ltd Board, which is responsible for deciding on an appropriate policy response.

The Audit Committee is also responsible for monitoring the quality and effectiveness of the internal audit department. In addition to ongoing review by the Audit Committee, an external review of LCH.C Ltd's internal audit function is conducted at least every three years. The most recent external review was presented to the Audit Committee in July 2015. LCH.C Ltd's Internal Audit function received the highest available rating, indicating that it generally conformed to the International Standards for the Professional Practice of Internal Auditing (published by the Institute of Internal Auditors).

LCH.C Ltd's operations and controls are also subject to a program of external audit. The external audit program is determined by the external auditors in consultation with the Finance department and is presented to the Audit Committee for approval. External reviews may be initiated where internal audit processes or internal controls identify potential areas of weakness that require additional external scrutiny and analysis.

2.8 Governance arrangements should ensure that the central counterparty's design, rules, overall strategy and major decisions reflect appropriately the legitimate interests of its direct and indirect participants and other relevant stakeholders. Governance arrangements should provide for consultation and stakeholder engagement through appropriate forums on operational arrangements, risk controls and default management rules and procedures. Major decisions should be clearly disclosed to relevant stakeholders and, where there is a broad market impact, the public.

The LCH.C Ltd Board includes representatives of participants, exchanges, trading venues and other stakeholders (see CCP Standard 2.4). The terms of reference of the Nominations Committee require that the LCH.C Ltd Board have two directors who are associated with or connected to shareholders, other than venue shareholders (User Directors) and up to two directors associated with or connected to shareholders that are exchanges, trading venues, multilateral trading facilities, alternative trading systems or similar (Venue Directors). LSEG also has representation on the Board.

Direct and indirect participants are represented on each of LCH.C Ltd's board-level committees, and on the LCH.C Ltd Risk Committee in both a voting and non-voting capacity (see CCP Standard 2.6). LCH.C Ltd also has a number of product advisory groups that represent users of particular clearing services. These groups are consulted on potential changes to these services.

LCH.C Ltd has an agreement in place for a group of 14 of the largest global banks to provide expertise, financial resources and strategic direction to LCH.C Ltd's SwapClear service (the SwapClear banks).⁴⁶

46 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

LCH.C Ltd must also consult with the SwapClear banks prior to LCH.C Ltd implementing material changes in certain pre-agreed areas. Prior to April 2014 the SwapClear Banks' role was directive, rather than consultative. The agreement also provides for revenue sharing with the SwapClear banks. The terms of the agreement between LCH.C Ltd and the SwapClear banks are summarised on LCH.C Group's website.

LCH.C Ltd established an Australian Member User Group (AMUG) for Australian direct clearing participants in March 2014. The AMUG provides a formal structure for LCH.C Ltd to seek input from Australian clearing participants of the SwapClear service on proposed changes to policy and risk management procedures and to provide timely updates on material changes. The AMUG also provides an opportunity for Australian participants to propose to LCH.C Ltd policy changes that they believe should be developed or prioritised. The AMUG holds face-to-face meetings on a roughly quarterly basis.

LCH.C Ltd consults with its participants about material decisions to the SwapClear rules, such as rules around default management, and discloses major decisions, such as senior management appointments and changes to operating rules, to participants, regulators and other stakeholders through member circulars and pre-press release notifications. Announcements are disclosed to the public through press releases and published on the LCH.C Group website and Twitter account.

LCH.C Ltd has also established arrangements to facilitate engagement with the banks that participate in its PPS. LCH.C Ltd holds bi-annual PPS Working Group meetings with its PPS banks to consult on topics including new initiatives and any potential associated issues. In addition, LCH.C Ltd involves PPS Bank operational staff via PPS Forums.

2.9 A central counterparty that is part of a group of companies should ensure that measures are in place such that decisions taken in accordance with its obligations as a central counterparty cannot be compromised by the group structure or by board members also being members of the board of other entities in the same group. In particular, such a central counterparty should consider specific procedures for preventing and managing conflicts of interest, including with respect to intragroup outsourcing arrangements.

LCH.C Ltd is a wholly owned subsidiary of LCH.C Group, and LCH.C Group is 57.8 per cent owned by the LSEG (see CCP Standard 1.1 and Appendix A). LSEG directors sit on the LCH.C Group and LCH.C Ltd Boards. LSEG also owns trading platforms for which LCH.C Ltd provides a clearing service. As noted in CCP Standard 1.1, LSEG has announced that it intends to launch an SSC that will provide shared technology and support services across all LSEG entities, including LCH.C Ltd.

To manage potential conflicts of interest, LCH.C Group and LSEG have agreed that any dealings between any LCH.C Group company and LSEG company will be conducted at arm's length on commercial terms and will be subject to prior approval of the LCH.C Group Board's independent directors. In addition, LSEG-appointed directors are unable to vote on these specific matters. With the exception of these matters, LSEG-appointed members of the LCH.C Ltd Board may attend and vote at all Board meetings. Special conflict rules apply to LSEG-appointed directors that permit them to be members of the LCH.C Ltd Board, notwithstanding their association with LSEG. Where there is a

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).

question as to whether an actual or potential conflict of interest exists, the matter would be determined by the independent directors, in consultation with the CCO (see CCP Standard 2.3).

LCH.C Ltd seeks to comply with the LCH.C Group Conflicts of Interest Policy, which sets out the methods for identifying and managing potential and actual conflicts of interest, including those between LCH.C Ltd and its stakeholders. The policy requires all its employees to declare, upon joining and then annually, any potential or actual conflicts of interest. A register of conflicts is held and updated on an annual cycle by the Compliance department.⁴⁷ LCH.C Ltd may take actions including avoidance measures or information barriers to avoid or mitigate potential or actual conflicts of interest. Conflicts which LCH.C Ltd cannot sufficiently avoid or mitigate are disclosed to the affected parties.

The LCH.C Group has two other wholly-owned subsidiaries that operate clearing services: LCH.C SA and LCH.C LLC. The three CCPs are legally separate entities, each with separate financial resources (see CCP Standard 1.1 and Appendix A). Further, each individual service within LCH.C Ltd, including the SwapClear service, has a separate default fund.

LCH.C Ltd has a formal governance structure that is independent of LCH.C Group and the other CCPs. However, many of the LCH.C Ltd board-level and executive-level committees have overlapping membership and routinely sit together (see Appendix A). Four of the 17 LCH.C Group Board members, including the Chairman, also sit on the LCH.C Ltd Board.

LCH.C Ltd does not consider that the group structure creates material conflicts in the management of risks and the fulfilment of LCH.C Ltd's regulatory and other obligations, particularly since the LCH.C Ltd Board retains ultimate responsibility for LCH.C Ltd. Where the LCH.C Group and LCH.C Ltd Boards have overlapping responsibility, the LCH.C Ltd Board is not bound by decisions made by the LCH.C Group Board. In addition, where there is overlap in the responsibility of the LCH.C Ltd CEO and LCH.C Group senior management, the authority of the LCH.C Ltd CEO is not superseded by the authority of LCH.C Group senior management. The LCH.C Ltd CEO is the first point of escalation in the event of a potential conflict of interest between LCH.C Ltd and LCH.C Group. The Articles of Association permit Directors of LCH.C Ltd to act as directors notwithstanding that they are on the board of another LCH.C Group entity. Were a conflict or potential conflict to arise in relation to a director's role on the LCH.C Group Board and the LCH.C Ltd Board, the conflicted members would be excluded from the relevant part of the board meeting unless a majority of the independent directors, in consultation with the CCO, gave their prior consent (see CCP Standard 2.3).

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's Risk Governance Framework aims to comprehensively identify the risks facing the CCP. This framework is given effect by more detailed LCH.C Group policies (which are adopted and annually reviewed by the LCH.C Ltd Board) that specify governance arrangements, procedures and controls (CCP Standard 3.1). LCH.C Ltd imposes risk-based obligations on SwapClear clearing participants, such as margin and contributions to pooled resources that are proportional to the scale and nature of individual participants' activities (CCP Standard 3.2). These obligations also provide incentives for participants to control the risks they pose to LCH.C Ltd (CCP Standards 3.3). LCH.C Ltd has adopted

⁴⁷ The Company Secretary maintains a register for board members.

policies that set out how LCH.C Ltd reviews and manages the risks it faces from other entities, both prior to entering into an arrangement with the entity and on a regular basis thereafter (CCP Standard 3.4). LCH.C Ltd's Recovery and Wind-down Plans identify the scenarios which may trigger the activation of these plans, and outline the detailed steps that LCH.C Ltd could take and the tools available to implement these plans (CCP Standard 3.5).

3.1 A central counterparty should have risk management policies, procedures and systems that enable it to identify, measure, monitor and manage the range of risks that arise in or are borne by the central counterparty. This risk management framework should be subject to periodic review.

Identification of risks

LCH.C Group has established a LCH.C Group Risk Governance Framework that the LCH.C Group Board expects to be followed across the Group CCPs. The LCH.C Ltd Risk Governance Framework implements the LCH.C Group Risk Governance Framework within LCH.C Ltd. The LCH.C Ltd Risk Governance Framework aims to comprehensively identify the risks to which LCH.C Ltd is potentially exposed, including those relating to the SwapClear service. The LCH.C Ltd Risk Governance Framework divides risks into a number of categories: financial; default management; operational; settlement, payment and custody; legal, regulatory and compliance; management; and corporate. Many of these categories have also been further divided into specifically identified risks (see CCP Standard 14.1 for some additional detail). The LCH.C Ltd Risk Governance Framework specifies the LCH.C Ltd Board's tolerance and expected minimum standards for each type of risk, as well as the roles and responsibilities regarding the management of these risks (see below).

Comprehensive risk policies, procedures and controls

The LCH.C Ltd Risk Governance Framework outlines: the risks faced by the CCP; the overall risk appetite of the CCP; minimum standards expected by the Board with respect to each type of risk; roles and responsibilities for measuring, monitoring and addressing each type of risk; and requirements regarding the performance of a self-assessment of the CCP against the Board's minimum standards at least annually (see below). LCH.C Ltd's stated risk appetite is broadly described as 'low'.

The LCH.C Ltd Risk Governance Framework is given effect by more targeted and detailed LCH.C Group policies, which have been adopted and are annually reviewed by the LCH.C Ltd Board. These policies address risks including: model risk (see CCP Standard 2.6); counterparty credit and default management risk (see CCP Standard 4); general market risk, and participant-specific sovereign, wrong-way and concentration risk (see CCP Standard 6); liquidity risk (see CCP Standard 7); settlement, payment and custody risk (see CCP Standards 9 and 15); investment risk (see CCP Standard 15); and operational risk (see CCP Standard 16). The LCH.C Ltd Risk Governance Framework and the detailed policies are reviewed by the LCH.C Ltd Board annually.

The LCH.C Ltd Risk Governance Framework assigns specific responsibilities within LCH.C Ltd, including to the: LCH.C Ltd CEO, CRO, CTO, CFO and COS; LCH.C Ltd Risk Committee; LCH.C Ltd Audit Committee; Heads of the LCH.C Ltd services; and various business support functions. As discussed in CCP Standard 2, the LCH.C Ltd CEO has broad responsibility for the management of LCH.C Ltd; the Risk Governance Framework also assigns specific responsibility to the LCH.C Ltd CEO for managing strategic and reputational risk. The LCH.C Ltd Service Heads are responsible for ensuring compliance

with the LCH.C Ltd Board's stated risk standards within their service lines at all times, with support functions held accountable for their performance within each service.

A number of internal boards, committees and groups are involved in overseeing the management of risk at LCH.C Ltd, including:

- *The LCH.C Ltd Board.* As noted above, the Board is ultimately responsible for the establishment and oversight of risk management at LCH.C Ltd, including setting risk tolerances and expected minimum standards (see CCP Standard 2.6).
- *The LCH.C Ltd Risk Committee.* The Risk Committee is a board sub-committee which considers and comments on LCH.C Ltd's risk appetite, tolerance and strategy, and assists the Board in fulfilling its risk management responsibilities (see CCP Standard 2.6).
- *The LCH.C Ltd Audit Committee.* The Audit Committee is a board sub-committee responsible for assessing the adequacy of internal controls, auditing the application of risk policies and providing compliance updates to the Board (see CCP Standard 2.7).
- *The LCH.C Ltd Local Management Committee.* The LCH.C Ltd LMC provides support and advice to the LCH.C Ltd Board on risk and operational matters, among others (see Appendix A). The LMC also provides direction and oversight to the LCH.C Ltd ERCo. The LCH.C Ltd LMC sits independently from the LMCs of the other LCH.C Group CCPs.
- *The LCH.C Ltd Executive Risk Committee.* The LCH.C Ltd ERCo, in conjunction with the other Group CCPs' ERCos, are responsible for the management, monitoring and oversight of all material risks faced by the LCH.C Group CCPs. The LCH.C Ltd ERCo reports directly to the LCH.C Ltd Risk Committee and the LCH.C Ltd LMC (see Appendix A).
- *The LCH.C Ltd Default Management Groups.* LCH.C Ltd maintains a DMG for each of its clearing services. These DMGs would be responsible for oversight of the DMP as it relates to their service. The SwapClear DMG includes the SwapClear Head of Business Risk and traders seconded from clearing participants (see CCP Standard 12.1).

The Group-level Credit Risk Management Committee (CRMC), Market Risk Management Committee (MRMC) and the Asset and Liability Committee (ALCo) support decision-making relating to risk management at LCH.C Ltd and report to the LCH.C Ltd ERCo (see Appendix A).

LCH.C Ltd has implemented an 'Enterprise Risk Management' framework to measure, monitor and address the risks identified in the Risk Governance Framework against the Board's expected minimum standards. The LCH.C Ltd CRO is responsible for ensuring the appropriate frameworks are in place to measure and monitor the risks identified, and that aggregated periodic reports assessing LCH.C Ltd against these standards are carried out with the findings reported at least annually to the Board. The Risk Governance Framework provides guidelines on the minimum information to be included in these reports for each of the specific risks identified in the Framework.

LCH.C Ltd shares details of its risk management framework and associated policies with the Bank.

Information and control systems

LCH.C Ltd has established systems to obtain information to measure and monitor its exposures across the risks identified in the LCH.C Ltd Risk Governance Framework. Key information systems include:

- *Counterparty credit risk.* The LCH.C Group Credit Risk team monitors inputs to counterparties' ICS assessments daily where applicable, and as soon as possible when new information becomes available (see CCP Standard 4.2).
- *Default fund sizing.* LCH.C Ltd obtains market data to enable calculation of the core default fund size, as well as any monthly or daily default fund additional margin (DFAM; see CCP Standard 4.4).
- *Margining.* SwapClear uses the Portfolio Approach to Interest Rate Scenarios (PAIRS) model to set initial margin requirements (see CCP Standard 6). LCH.C Ltd obtains market data at multiple times intraday in order to calculate both initial and variation margin requirements. LCH.C Ltd also obtains information used to measure and calculate counterparty risk multiplier, liquidity (concentration) add-on and basis risk add-on margin requirements.
- *Liquidity assessments.* LCH.C Ltd runs liquidity assessments for intraday, end-of-day, forward-looking and stressed scenarios (see CCP Standard 7.2).

LCH.C Ltd also seeks to monitor its aggregate exposures to individual counterparties across activities. LCH.C Ltd applies limits to exposures to clearing participants arising from both clearing and investment activities (CCP Standard 15), and to commercial concentration banks arising from both concentration and investment activities (CCP Standard 9.3).

SwapClear provides clearing participants with a tool to estimate the initial margin requirement that would result from user-specified hypothetical portfolios. Participants may then estimate initial margin requirements for both their own and their clients' positions (CCP Standard 6).

Internal controls

The LCH.C Ltd Risk Governance Framework lists a set of performance indicators that should be used to monitor the effectiveness of the risk management framework. These indicators include: backtesting of initial margins, counterparty credit scores, and default fund sizing to meet 'cover two' (see CCP Standards 4 and 6); aggregate exposure measures (see above); liquidity ratios (see CCP Standard 7); and operational assessments (see CCP Standard 16). These indicators are included in the CRO's presentations to the LCH.C Ltd Board regarding compliance with the Enterprise Risk Management framework.

As noted above, the LCH.C Ltd Board reviews the LCH.C Ltd Risk Governance Framework annually. More detailed risk policies and procedures are also formally reviewed annually, or more frequently where required. Methodologies for the calculation of key risk parameters including margin levels (see CCP Standard 6.7), stress testing (see CCP Standard 4.5), collateral haircuts (see CCP Standard 5.3) and liquidity arrangements (see CCP Standard 7.1) are independently reviewed at least annually.

The LCH.C Ltd Audit Committee is responsible for reviewing that the application of risk policies is consistent with the LCH.C Ltd Board's expected standards as set out in LCH.C Ltd's Risk Governance Framework. LCH.C Ltd's Internal Audit department is responsible for providing independent internal reviews on the effectiveness of LCH.C Ltd's risk management arrangements, and has direct access to the LCH.C Ltd Board and Audit Committee. LCH.C Ltd's operations and controls are also subject to a program of internal reviews and topic-specific external reviews (see CCP Standard 2.7).

3.2 A central counterparty should ensure that financial and other obligations imposed on participants under its risk management framework are proportional to the scale and nature of individual participants' activities.

LCH.C Ltd imposes financial obligations on SwapClear clearing participants primarily in the form of margin requirements and prefunded and promissory default resources. These obligations are generally proportional to the scale and nature of a participant's activities.

Initial margin requirements for clearing participants in the SwapClear service are calculated using the PAIRS methodology, and are a function of the size, volatility and correlations of a participant's cleared positions (see CCP Standard 6.3). Additional margin can be called from a participant if its positions become more concentrated, illiquid, or are more exposed to basis risk (CCP Standard 6.1).

Prefunded default fund contributions are called from participants in proportion to their initial margin requirements (subject to a minimum contribution of £10 million per clearing participant), and therefore in proportion to the scale and nature of their activities (see CCP Standard 4.4). DFAM is called on participants with stress-test losses over initial margin (STLOIM) that exceed thresholds based on the participant's creditworthiness. Consequently, participants that bring disproportionate risk to the CCP collateralise more of that risk on a 'defaulter-pays' basis. Both Unfunded Contributions (to meet uncovered losses if the default fund was depleted) and Supplementary Contributions (to replenish the default fund once the SwapClear DMP had been completed) are based on participants' contributions to the default fund, and are therefore proportional to the scale of their activities (CCP Standard 4.8). The allocation of both Prefunded and any Unfunded Contributions to currency- and product-specific Auction Incentive Pools (AIPs) in the SwapClear DMP is based on each participant's market risk for each currency and product in the defaulting participant's portfolio. As a result, participants that do not clear certain currencies or products (e.g. inflation swaps) are less likely to have exposures to losses on these positions. In the event that uncovered credit losses exceeded both Prefunded and Unfunded Contributions, variation margin gains haircutting (VMGH) could be used (see CCP Standard 4.8). A clearing participant's potential obligations under VMGH are related to the size and nature of its positions.

SwapClear clearing participants must meet certain operational requirements (see CCP Standards 16.6 and 17.2). All SwapClear participants are required to meet certain base operational standards. However, where relevant and practicable, some operational requirements are tied to the scope of a clearing participant's activities – for example, the requirement to participate in default management fire drills is limited to the currencies in which the participant has cleared positions.

3.3 A central counterparty should provide incentives to participants and, where relevant, their customers to manage and contain the risks they pose to the central counterparty.

SwapClear's methodologies for calculating margin requirements and default fund contributions create incentives for participants to manage and contain the risks they pose to LCH.C Ltd. As discussed in CCP Standard 3.2, financial obligations imposed on SwapClear clearing participants are proportional to the risk the participants and their clients pose to the CCP. This serves as an incentive to both clearing participants and their clients to limit such risks. LCH.C Ltd also has the ability to call additional margin if it considers there are additional risks not captured by its initial margin model, which incentivises the control of these risks by its clearing participants.

3.4 A central counterparty should regularly review the material risks it bears from and poses to other entities (such as other FMIs, money settlement agents, liquidity providers and service providers) as a result of interdependencies, and develop appropriate risk management tools to address these risks.

LCH.C Ltd regularly reviews the legal (see CCP Standard 1), credit (see CCP Standard 4), liquidity (see CCP Standard 7), general business (see CCP Standard 14), custody and investment (see

CCP Standard 15) and operational risks (see CCP Standard 16) that it is exposed to due to interdependencies with other entities, and has policies and procedures to address such risks. LCH.C Group policies on settlement, payment and custody risk, counterparty credit risk, liquidity risk and operational risk, among others, are reviewed annually by the LCH.C Ltd Board. Specific risk management tools used by LCH.C Ltd include annual formal credit risk assessments of money settlement agents, investment counterparties and custodians (see CCP Standard 4.2), and (at least) biennial operational and legal due diligence on CSDs, PPS and concentration banks, with operational performance monitored on a quarterly basis (see CCP Standards 9.3, 15.2 and 19).

LCH.C Ltd has also established business continuity plans (BCPs) to allow for recovery and resumption of critical services. These plans are outlined in the LCH.C Group Business Continuity Management (BCM) Policy (see CCP Standard 16.7 for details). All LCH.C Ltd service providers are required to implement business continuity arrangements equivalent to those of LCH.C Ltd (see CCP Standards 16.5 and 16.9). LCH.C Ltd has also established a Recovery Plan and a Wind-down plan (see CCP Standard 3.5).

LCH.C Ltd considers that, by managing the risks posed to its solvency and operation, it limits the risks it poses to other entities and financial markets.

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 established a Recovery Plan and Wind-down Plan, which set out how it would continue or cease, respectively, its operations if it suffered extreme losses. Both plans have been designed to apply across 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 classes of scenario that could potentially trigger these plans: exposure to losses arising from clearing participant defaults; and exposure to non-clearing-participant-default losses arising from, for example, fraud or treasury investment losses. The Recovery and Wind-down plans are reviewed at least annually, or more frequently if there is a material change to LCH.C Ltd's business model.

The Recovery Plan identifies 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 (see CCP Standards 4.8 and 12.1). In the event of a non-clearing-participant-default loss, the Recovery Plan would be triggered by treasury investment losses greater than €15 million (see CCP Standard 14.3), or operational or general business risk losses that consumed the regulatory capital that LCH.C Ltd holds against these risks (see CCP Standard 14.2). The Recovery Plan would also be triggered by liquidity shortfalls that arose from a clearing participant default or non-clearing-participant-default loss (see CCP Standard 7.9). A breach of the triggers above for either default or non-default losses would result in notification to the LCH.C Ltd LMC (see Appendix A for more details on the LMC). The LMC would review the trigger, consult with the BoE and make a recommendation to the LCH.C Ltd Board regarding whether to trigger the Recovery Plan. The LCH.C Ltd Board has ultimate responsibility for deciding whether to invoke the Recovery Plan.

At the time it established its Recovery Plan, LCH.C Ltd performed an assessment of its recovery tools in an attempt to ensure they: were comprehensive, effective and transparent; provided appropriate incentives; and minimised negative impacts on participants and markets. Recovery tools used to allocate uncovered credit losses or liquidity shortfalls arising from a participant default scenario, as well as allocation of treasury investment losses, are generally tested as part of annual fire drills (see CCP Standard 12.4). In addition, SwapClear carries out regular internal testing of recovery tools to ensure staff are familiar with the tools and processes, and to identify potential improvements. Other non-default loss tools such as insurance and allocated capital resources are reviewed through annual renewal cycles and monthly capital reporting, respectively.

As part of its Recovery Plan, LCH.C Ltd has a capital raising strategy in place that it would follow in the event that it needed to replenish its capital (see CCP Standard 14.5). LCH.C Ltd also has rules and procedures in place to replenish the SwapClear default fund once the DMP is complete (see CCP Standard 4.8).

CPMI-IOSCO released a report in 2014 that provides guidance to FMIs such as CCPs on how to develop plans to enable them to recover from threats to their viability and financial strength that might prevent them from continuing to operate. LCH.C Ltd has been working towards revising its Recovery Plan in light of this guidance and expects to release an updated version in the coming period. The Bank expects LCH.C Ltd to continue its dialogue with the Bank about its arrangements to replenish the default fund after a clearing participant default in light of this guidance.

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 October 2014 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 regulators in other jurisdictions (including the Bank), either bilaterally and/or through the EMIR and LCH.C Ltd Global Colleges (see Section 3.5.2).

Since LCH.C Ltd is a UK-based CS facility, any crisis management actions would be led by the UK resolution authority, the BoE. In the event that LCH.C Ltd was entered into resolution, the BoE would have the ability to exercise its resolution tools under the UK *Banking Act 2009*. Clarification as to how such a scenario would work in practice is expected to develop in light of pending EU legislation relating to CCP recovery and resolution. In addition, during the Assessment period, the BoE established a crisis management group (CMG) for LCH.C Ltd, of which the Bank is a member. The CMG will discuss and facilitate development of the resolution plan for LCH.C Ltd, taking into account the cross-border nature of LCH.C Ltd's business. It is expected that this work will cover, among other things, clarification of the information that regulators would require from LCH.C Ltd for the purposes of resolution planning.

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 maintains a comprehensive framework for managing its credit exposures to its clearing participants, which applies to all services, including SwapClear (CCP Standard 4.1). Under this framework, LCH.C Ltd regularly monitors its credit exposures, including information on participants' credit standing (CCP Standard 4.2). In responding to any issues identified through monitoring, LCH.C Ltd is able to impose activity restrictions or additional controls, including calls for additional margin (CCP Standard 4.3).

LCH.C Ltd also monitors and manages the magnitude of its exposures to its clearing participants through both daily and intraday initial and variation margin calculations (CCP Standard 4.2), and through daily stress tests that estimate the effects of extreme but plausible scenarios on exposures (CCP Standard 4.5). LCH.C Ltd calibrates the size of its financial resources to cover its largest potential credit exposure to any two participants and their affiliates in the extreme but plausible scenarios covered in its stress tests, consistent with obligations for a facility that is systemically important in multiple jurisdictions. LCH.C Ltd maintains a SwapClear default fund that is segregated from the default funds of other services (CCP Standards 4.4, 4.6). LCH.C Ltd calls daily and monthly DFAM from participants with very large STLOIM (CCP Standard 4.7). LCH.C Ltd has rules and procedures that set out how it would address uncovered credit losses from participant defaults (CCP Standard 4.8).

The Bank has set LCH.C Ltd two regulatory priorities related to this CCP Standard. One regulatory priority is for LCH.C Ltd to continue to review its interpretation of 'extreme but plausible' market conditions in designing its stress-test scenarios. This work should be undertaken in light of evolving international best practice, including the outcomes of forthcoming CPMI-IOSCO work on stress testing. The other is for LCH.C Ltd to continue its dialogue with the Bank about its arrangements to replenish the SwapClear default fund in the event of a drawdown following the default of a SwapClear clearing participant. LCH.C Ltd should demonstrate that its current arrangements for returning to the full level of cover required under CCP Standard 4.4 minimise the potential for procyclicality, to the extent practicable and prudent.

4.1 A central counterparty should establish a robust framework to manage its credit exposures to its participants and the credit risks arising from its clearing processes. Credit exposures may arise from current exposures, potential future exposures, or both.

LCH.C Ltd maintains a comprehensive framework for managing credit exposures to its participants, which applies to all services, including SwapClear. This framework comprises: a stress-testing regime (see CCP Standards 4.5 to 4.7); the use of variation margin to mark positions to market (see CCP Standard 6); and the maintenance of prefunded financial resources. These financial resources comprise initial margin and additional margin (see CCP Standard 6), and a pool of prefunded mutualised resources (see CCP Standard 4.4). LCH.C Ltd also has rules and procedures that set out how it would address any uncovered credit losses it may face as a result of a clearing participant default (CCP Standard 4.8).

4.2 A central counterparty should identify sources of credit risk, routinely measure and monitor credit exposures, and use appropriate risk management tools to control these risks. To assist in this process, a central counterparty should ensure it has the capacity to calculate exposures to participants on a timely basis as required, and to receive and review timely and accurate information on participants' credit standing.

LCH.C Ltd's Risk Governance Framework identifies the universe of risks to which the CCP can potentially be exposed. The Framework identifies a number of sources of credit risk:

- clearing participants (see the remainder of CCP Standard 4)
- PPS banks and concentration banks (see CCP Standard 9)
- custodians (see CCP Standard 15)
- investment counterparties and issuers of securities held by LCH.C Ltd as investments (see CCP Standard 15).

The CRMC is responsible for managing and monitoring credit risk across LCH.C Group, including credit risk from clearing participants. The CRMC is chaired by the Group Head of Credit Risk, and its members include representatives from various teams within LCH.C Group including the CRO of each LCH.C Group CCP. Any decision made by the CRMC that the Group Head of Credit Risk views as having a material impact on risk is escalated to the LCH.C Ltd ERCo.

Applications from prospective clearing participants must be approved by the CRMC and LCH.C Ltd ERCo. LCH.C Ltd's Rulebook sets out a variety of participation requirements (see CCP Standard 17).

The LCH.C Group Counterparty Credit Risk Policy sets out the standards for ongoing monitoring of the credit standing of clearing participants across the LCH.C Group CCPs, including LCH.C Ltd.⁴⁸ LCH.C Group maintains a Group Credit Risk team, which is responsible for setting the methodology and assigning an ICS to each current or prospective clearing participant, sovereign or other counterparty, which range from 1 (highly creditworthy) to 10 (currently defaulting). LCH.C Group's Credit Risk team considers, among other things, analysis of the entity's financial ratios and operational capability. The Group Credit Risk team conducts ongoing monitoring of the external credit ratings from Standard & Poor's, Fitch, and Moody's, and credit ratings implied by the prices of bonds, equities and credit default swaps. Each counterparty's ICS is formally reviewed at least once a year, and clearing participants and other counterparties with an ICS above a predefined threshold are reviewed at least once every six months.

The Group Credit Risk team monitors on an ongoing basis and summarises in a daily report clearing participants' credit quality. A significant deterioration may be escalated to the CRMC to determine whether that counterparty's ICS needs to be downgraded. The Group Head of Credit Risk or a delegate may recommend to the Group CRO to approve an ICS downgrade with immediate effect. Should a clearing participant's ICS deteriorate to a certain level, it may be placed on a 'watch list'. It would then be subject to additional monitoring, including regular reporting on the participant to the CRMC. Further actions may also be discussed with the participant.

SwapClear uses several tools to control its exposures to clearing participants, including: variation margin, initial margin, and various types of additional margin (CCP Standard 6); prefunded mutualised resources (CCP Standard 4.4); and rules for allocating uncovered credit losses (CCP Standard 4.8).

The SwapClear Risk team monitors LCH.C Ltd's exposures to clearing participants in SwapClear. Additionally, the LCH.C Group Market Risk team is responsible for the day-to-day monitoring and reporting of LCH.C Ltd's exposures to clearing participants across all services. LCH.C Ltd can monitor its current exposure and potential future exposure to each house and client account on a timely basis.

48 The Group Counterparty Credit Risk Policy also sets out standards for monitoring the credit risk of other counterparties, such as issuers of collateral (see CCP Standard 5) and investment counterparties (see CCP Standard 15).

Variation margin, which measures current exposure, and initial margin, which measures potential future exposure, are recalculated whenever LCH.C Ltd receives updated price data. This occurs multiple times per day (CCP Standard 6). Additionally, SwapClear recalculates initial margin each time a participant submits a trade, to reflect the change in the participant's position (CCP Standard 6.4).

The Group Credit Risk team monitors a number of credit-risk-related limits, including the ratio of a participant's stress-test losses over total margin (STLOTM) to net capital, which participants must keep below a given threshold.⁴⁹ It also monitors the ratio of a participant's initial margin to net capital, which participants must keep below the limit specified for its ICS. Breaches of these or other credit-risk-related limits may be escalated to the CRMC, which would decide on the most appropriate action to take.

In the course of its monitoring of credit exposures, LCH.C Ltd may identify a risk not appropriately captured by its existing margin models. To cover this risk, LCH.C Ltd may at its discretion call additional margin not described in its policies (see CCP Standard 6.1).

4.3 A central counterparty should have the authority to impose activity restrictions or additional credit risk controls on a participant in situations where the central counterparty determines that the participant's credit standing may be in doubt.

As discussed in CCP Standard 4.2, the Group Credit Risk team monitors the inputs into each clearing participant's ICS and other indicators of their creditworthiness. If the Group Credit Risk team had concerns about a participant, it would escalate the issue to the CRMC. The CRMC would decide on whether to downgrade the participant's ICS, and on any other actions to take. These could include:

- Tightening the credit-risk-related limits, as described in the Group Counterparty Credit Risk Policy (see CCP Standard 4.2). For example, the participant's maximum permitted ratio of its initial margin to its net capital range may be lowered.
- Applying higher margin requirements, as described in various LCH.C Ltd and SwapClear policies. For example, the participant may be called for counterparty risk multiplier margin (CCP Standard 6.1) or required to collateralise its entire STLOIM with daily DFAM (CCP Standard 4.7); or LCH.C Ltd may reduce the participant's real-time trade registration (RTTR) component tolerance to zero (CCP Standard 4.4).
- Reviewing the non-clearing functions of the counterparty.
- In extreme cases, asking the LCH.C Ltd ERCo to decide whether to suspend or terminate the participant.

A participant with an ICS at a level that required CRMC action would usually be placed on the watch list.

4.4 A central counterparty should cover its current and potential future exposures to each participant fully with a high degree of confidence using margin and other prefunded financial resources (see CCP Standard 5 on collateral and CCP Standard 6 on margin). 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 maintain additional financial resources to cover a wide range of potential stress scenarios that should include, but not be limited to, the default of the two participants and their affiliates that would

49 STLOTM is a participant's stress test loss minus its initial margin, additional margin and default fund contribution.

potentially cause the largest aggregate credit exposure for the central counterparty in extreme but plausible market conditions. All other central counterparties should maintain additional financial resources sufficient to cover 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 potentially cause the largest aggregate credit exposure for the central counterparty in extreme but plausible market conditions. In all cases, a central counterparty should document its supporting rationale for, and should have appropriate governance arrangements relating to, the amount of total financial resources it maintains.

LCH.C Ltd aims to hold prefunded financial resources for the SwapClear service to cover the default of the two clearing participants and their affiliates that would cause the largest aggregate credit exposure in extreme but plausible conditions (the so-called cover two standard). LCH.C Ltd calibrates the size of these resources based on daily stress tests (see CCP Standards 4.5-4.7).

The LCH.C Ltd Rulebook provides for the segregation of the SwapClear default fund from the financial resources of other LCH.C Ltd clearing services. Accordingly, the financial contributions of non-defaulting clearing participants in respect of the SwapClear service cannot be utilised to meet losses arising from a clearing participant default in other services. Further, this segregation provides for the continuation of LCH.C Ltd's other services should the SwapClear service close (and vice-versa).

The SwapClear default fund consists of two components: a 'core component' (£2.26 billion at the end of September 2015), which is sized by stress testing, and a RTTR component (£400 million), which is intended to support the intraday provision of credit needed to facilitate 'real-time' trade registration.

The LCH.C Ltd Rulebook specifies, at a high level, the method by which the core component and RTTR component are sized. The Rulebook also places a floor of £1 billion and a cap of £5 billion on the total size of the default fund (the combined value of the core component and RTTR component).

The LCH.C Group Financial Resource Adequacy Policy describes, in more detail than the Rulebook, the process by which stress test losses are used to size the core component. The policy is maintained by Group Risk, and is reviewed annually by the LCH.C Ltd ERCo, the LCH.C Ltd Risk Committee and the LCH.C Ltd Board.

Core component

The size of the core component of the SwapClear default fund is derived from the sum of the two largest participant STLOIM from the same scenario on any one day during the previous 60 business days.⁵⁰ To calculate the core component, a buffer is added to this combined stressed exposure value, and the aggregate value of any monthly DFAM is then subtracted.

LCH.C Ltd uses monthly DFAM to ensure that the participants with the largest STLOIM (used in calculating the size of the default fund) collateralise more of their own risk. If such a participant's largest STLOIM under any scenario in the 60-day look-back period exceeds 45 per cent of the sum of the combined stressed exposure value and buffer, that participant may be required to post monthly DFAM to cover the amount its STLOIM exceeds the 45 per cent threshold.⁵¹ By reducing the size of the default fund core component by the value of monthly DFAM, LCH.C Ltd shifts the balance

50 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 clients of the participant and its affiliates.

51 This method of determining monthly DFAM came into effect on 1 October 2014; before that, it was charged to a clearing participant if it had an 'outsized' STLOIM in the previous 60 business days. The size of monthly DFAM called may be reduced in order to comply with the EMIR requirement that the default fund covers potential losses arising from the simultaneous default of the second and third largest clearing members.

between 'defaulter pays' and mutualised resources used to meet the cover two requirement. Unlike the default fund, monthly DFAM is not mutualised and can only be used to cover losses from the clearing participant that posted it. In practice, LCH.C Ltd only calls monthly DFAM on the participant with the largest STLOIM used in sizing the default fund core component. (LCH.C Ltd also calls daily DFAM from any participant that has a STLOIM in excess of a specified percentage of the core component; this does not, however, affect the sizing of the core component (see CCP Standard 4.7).)

The core component of the default fund is resized on the first business day of the month, and LCH.C Ltd holds each clearing participant's default fund and monthly DFAM contributions until the default fund is resized the next month. The proportion of the core component that each SwapClear participant is obliged to contribute is calculated according to the participant's average initial margin requirement for the previous month (based on its house positions only, as opposed to both house and client positions) as a share of SwapClear participants' total initial margin requirements. Additional margin (see CCP Standard 6.1) is ignored for this calculation. Contributions are subject to a minimum of £10 million per clearing participant. Contributions are rebalanced on a monthly basis to account for changes in relative shares of participants' initial margin requirements.

Real-time trade registration component

The real-time trade registration (RTTR) component is a pool of mutualised resources that is intended to support the intraday provision of credit needed to facilitate 'real-time' trade registration. During the SwapClear service's operating hours, trades are novated to the CCP within 10 or 60 seconds of being submitted (depending on the execution venue), in accordance with CFTC requirements. A trade is only novated if each participant's incremental initial margin requirement is covered by collateral held by LCH.C Ltd or is within its RTTR component tolerance. By extending RTTR component tolerances, the frequency with which LCH.C Ltd can register trades is not restricted by the frequency with which it can collect initial margin, and participants are not required to fully prefund all trades. LCH.C Ltd assigns RTTR component tolerances to participants based on their ICSs, with higher tolerances assigned to participants with lower ICSs.

The RTTR component is currently sized at £400 million. Usage of the RTTR component is limited on a cover two basis, meaning that the highest possible RTTR component tolerance for a member group is £200 million. If usage of the RTTR component was consistently high or low, LCH.C Ltd may review the size of the RTTR component. Based on the review, the LCH.C Group Executive Committee (ExCo) and the LCH.C Ltd Risk Committee may approve a change in the RTTR component size. Each participant contributes to the RTTR component in proportion to its RTTR component tolerance usage relative to 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 RTTR component are rebalanced on the same schedule as those to the core component.

Client buffer

During the Assessment period, LCH.C Ltd introduced an optional client buffer account for its clearing participants as part of its SwapClear Client Clearing Service (SCCS). The client buffer can be used to cover intraday liabilities arising from new trade registrations by clients and intraday margin liabilities on existing positions. A single client buffer account is used to cover all of an individual clearing participant's client accounts (and client buffer lodged by one clearing participant cannot be applied to liabilities arising from clients of other clearing participants). Use of the client buffer is in chronological order of trade submission and is recyclable during the day (that is, if a client's liabilities decrease, the buffer becomes available for use by other clients of that clearing participant). If the client buffer came to be fully depleted, any further trade registrations would rely on the clearing participant's access to

the trade registration fund or excess collateral. The client buffer is funded by the clearing participant in cash in one of GBP, EUR or USD (but not a mix).

4.5 A central counterparty should, through rigorous stress testing, determine the amount and regularly test the sufficiency of its total financial resources available in the event of a default or multiple defaults in extreme but plausible market conditions. Stress tests should be performed daily using standard and predetermined parameters and assumptions. On at least a monthly basis, a central counterparty should perform a comprehensive and thorough analysis of stress-testing scenarios, models and underlying parameters and assumptions used to ensure they are appropriate for determining the central counterparty's required level of default protection in light of current and evolving market conditions. A central counterparty should perform this analysis of stress testing more frequently when the products cleared or markets served display high volatility, become less liquid, or when the size or concentration of positions held by a central counterparty's participants increases significantly. A full validation of a central counterparty's risk management model should be performed at least annually.

LCH.C Ltd sizes the default fund core component using daily stress tests, which it calls 'exposure stress tests'. Exposure stress tests are also used to calculate daily DFAM and monthly DFAM (CCP Standard 4.4).

SwapClear's exposure stress-testing methodology uses 174 stress scenarios. Each scenario is a set of movements in yield curves, inflation curves and exchange rates (see CCP Standard 4.6). The STLOIM of a participant from a particular scenario is the loss on the participant's portfolio that would result from that scenario, less that participant's initial margin.⁵² To calculate the STLOIM of a participant on a particular day, SwapClear takes the participant's worst STLOIM from the 174 scenarios.

SwapClear assesses the adequacy of its stress-testing methodology through reverse stress tests (see CCP Standard 4.6), monthly reviews by an internal working group of staff from SwapClear risk, and annual validations by an independent validator.

The monthly reviews of the stress testing methodology cover the factors driving the latest rebalancing of the default fund, stress scenarios for any new products being introduced to SwapClear, and the comprehensiveness of SwapClear's stress scenarios. The comprehensiveness of stress scenarios is assessed using qualitative analysis and a 'distribution led tool'. This tool estimates the distribution of a large number of risk factors, and uses that distribution to calculate the plausibility of the scenario currently sizing the default fund. The tool is then used to identify a scenario with similar plausibility that could result in larger losses. If the SwapClear internal working group found that a new scenario was required, this would need to be approved through SwapClear's internal governance procedures, with the LCH.C Ltd ERCo making the final decision on the adoption of the proposed scenario.

The annual validation of SwapClear's stress testing methodology may be conducted by an external party or by the independent model validation team in LCH.C Group (see CCP Standard 2.6 for a discussion of reviews more generally). The most recent independent validation was conducted in July 2015. The validation did not find any reason to conclude that the reviewed stress scenarios were unsatisfactory, though it did specify a few required actions, which SwapClear expects to implement by end-2015.

⁵² If the participant has clients, LCH.C Ltd assumes the default of any clients whose default would increase the STLOIM. That is, each client whose profit-and-loss plus initial from that scenario is negative is assumed to default.

4.6 In conducting stress testing, a central counterparty should consider the effect of a wide range of relevant stress scenarios in terms of both defaulters' positions and possible price changes in liquidation periods. Scenarios should include relevant peak historic price volatilities, shifts in other market factors such as price determinants and yield curves, multiple defaults over various time horizons, simultaneous pressures in funding and asset markets, and a spectrum of forward-looking stress scenarios in a variety of extreme but plausible market conditions.

SwapClear's set of 174 stress scenarios comprises 117 'historical' scenarios and 57 'theoretical' scenarios. The stress regime is developed to identify extreme but plausible tail losses in each member portfolio beyond the 99.7 per cent confidence level applied in the PAIRS margin model. A scenario may be deemed to be plausible if it has happened in the past 30 years.

Historical scenarios are sets of yield curve, inflation curve and exchange rate moves that have occurred in SwapClear's dataset. The historical scenarios used by SwapClear were generated in a variety of different ways, such as:

- identifying the largest historical moves in the short, medium and long tenors of key yield curves
- identifying, for each of a few key currencies, the largest historical widening and narrowing moves in the spread between interbank offer rates (such as EURIBOR) and overnight rates (such as EONIA)
- replicating the yield curve moves observed during the 1987 stock market crash.

The theoretical scenarios are hypothetical movements that are judged to be extreme but plausible by LCH.C Ltd. Almost all of SwapClear's theoretical scenarios were generated by positing a particular combination of movements in yield curves or inflation curves and then calibrating the size the movements based on historical data. LCH.C Ltd used a variety of types of movements to generate its theoretical scenarios, including:

- a level shift or twist in all yield curves
- narrowing or widening in the spread between interbank offer rates and overnight rates in many currencies simultaneously
- narrowing or widening moves in the yield curves of different pairs of major currencies.

SwapClear includes three 'forward-looking' scenarios, which are scenarios generated by assuming a macroeconomic or financial event and then estimating the movements in yield curves that might occur as a result. SwapClear's current forward-looking scenarios all relate to a hypothetical break-up of the Eurozone.

SwapClear uses two types of reverse stress testing to assess the adequacy of the financial resources it holds against clearing participant defaults:

- The first type assesses whether it is plausible that the default of more than two participants could cause losses in excess of SwapClear's current financial resources. To do this, SwapClear calculates the distribution of losses in the service due to participant defaults, which depends on the assumed probability of default for each participant and its stressed exposure at default. The 'extreme but plausible' (once-in-30-year) loss is calculated from this distribution, and compared to the existing default resources. LCH.C Ltd has informed the Bank that SwapClear's prefunded resources were sufficient to cover the once-in-30-year losses calculated by this test.

- The second type of reverse stress tests assesses whether there are plausible scenarios that should be added to SwapClear’s stress testing. This is done by generating a set of ‘perturbed’ stress scenarios that would exhaust all of SwapClear’s prefunded default resources in the event of the default of the two participants with the largest aggregate exposure. SwapClear then assesses the plausibility of these scenarios qualitatively and quantitatively.

Reverse stress testing occurs each quarter; results are discussed at the LCH.C Ltd ERCo and notified to the LCH.C Ltd Risk Committee.

The Bank has set a regulatory priority for LCH.C Ltd to encourage it to continue to review its interpretation of ‘extreme but plausible’ market conditions in designing its stress-test scenarios. This work should be done in light of evolving international best practice, including outcomes of CPMI-IOSCO work on stress testing.

4.7 A central counterparty should have clearly documented and effective rules and procedures to report stress-test information to appropriate decision-makers and ensure that additional financial resources are obtained on a timely basis in the event that projected stress-test losses exceed available financial resources. Where projected stress-test losses of a single or only a few participants exceed available financial resources, it may be appropriate to increase non-pooled financial resources; otherwise, where projected stress-test losses are frequent and consistently widely dispersed across participants, clear processes should be in place to augment pooled financial resources.

Stress testing is incorporated as part of the routine oversight and monitoring of SwapClear clearing participants. The STLOIM for the two participants giving rise to the largest to the largest exposures in SwapClear are included in a daily report that is distributed to members of the ExCo. Furthermore, large STLOIM are discussed by each service at bi-weekly meetings attended by the LCH.C Ltd CRO. Additionally, a summary of the stress-test results and accompanying analysis is presented to the LCH.C Ltd Risk Committee for review on a quarterly basis.

SwapClear calls monthly DFAM from any participant for which the largest STLOIM in the past 60 business days are large relative to the default fund (see CCP Standard 4.4).

LCH.C Ltd also calls daily DFAM from any participant with STLOIM in excess of a predefined proportion of the default fund. The predefined proportion ranges from zero to 45 per cent, depending on the participant’s ICS. The amount called is the difference between that participant’s STLOIM and the relevant proportion of the core component of the default fund on that day, offset by any monthly DFAM contributed by that participant. On the morning of each business day, LCH.C Ltd notifies participants via email of any daily DFAM due.⁵³ A participant’s PPS bank must provide LCH.C Ltd with confirmation that it will pay the amounts required within one hour of receiving the notification. The purpose of daily DFAM is to ensure participants with outsized exposures collateralise more of their own risk.

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

53 This calculation is based on a participant’s positions and initial margin held at the end of the previous business day.

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.

The LCH.C Ltd Recovery Plan describes the steps LCH.C Ltd would take to maintain the continuity of the services it provides in the event that it suffered extreme losses. The plan describes the arrangements by which LCH.C Ltd would allocate losses arising from participant defaults (covered in this Standard) and losses arising from sources other than participant defaults (CCP Standard 3.5).

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 (€47 million)
- non-defaulting clearing participants' default fund contributions (as of the end of September 2015, £2.66 billion minus the value of the defaulting clearing participant's contribution).

If the losses were greater than the size of these resources, uncovered credit losses would be allocated using the following rules-based tools:

- 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 (this is commonly known as VMGH). 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. VMGH would continue each day until the defaulting clearing participant's trades were successfully auctioned and transferred under the SwapClear DMP. VMGH 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 VMGH 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 CCP Standard 3.5). If the SwapClear service were wound down, all outstanding SwapClear contracts would be closed. SwapClear would calculate a sum owing between it and each non-defaulting clearing participant. LCH.C Ltd would view itself as owing participants any payments withheld from them under VMGH; that is, it would effectively unwind VMGH. 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 once the SwapClear DMP has been completed. If the value of the remaining SwapClear default fund was lower than the SwapClear Fund Floor (i.e. the minimum size of the default fund – currently set at £1 billion) at the time that the SwapClear DMP 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. Non-defaulting clearing participants must meet these calls within two business days. During this period, SwapClear would continue to meet cover two by calling daily DFAM from its participants. The determination of SwapClear default fund contributions would revert to the usual resizing method 30 days after the SwapClear DMP was completed. The default fund would therefore be fully replenished with fixed mutualised resources in one to two months.⁵⁴

LCH.C Ltd is encouraged to continue its dialogue with the Bank about its arrangements to replenish the SwapClear default fund in the event of a drawdown following the default of a SwapClear clearing participant. LCH.C Ltd should demonstrate that its current arrangements for returning to the full level of cover required under CCP Standard 4.4 minimise the potential for procyclicality, to the extent practicable and prudent.

Standard 5: Collateral

A central counterparty that requires collateral to manage its or its participants' credit exposures should accept collateral with low credit, liquidity and market risks. A central counterparty should also set and enforce appropriately conservative haircuts and concentration limits.

LCH.C Ltd accepts only high-quality, liquid assets as collateral (CCP Standard 5.1). LCH.C Ltd accepts a range of currencies and traded securities, and notifies participants of changes in collateral eligibility in advance where possible (CCP Standard 5.2). Collateral is marked to market daily, and base haircuts are applied to all non-cash collateral to cover market risk over a three-day holding period. Additional haircuts are applied to cover credit, wrong-way, concentration, liquidity, and foreign exchange risk

⁵⁴ If another clearing participant defaults during this 30-day period, then default fund contributions will not revert to the usual resizing method until 30 days after the completion of that participant's DMP.

(CCP Standards 5.3, 5.4). LCH.C Ltd may also use concentration limits to manage concentration or liquidity risks (CCP Standard 5.5). Collateral haircuts, concentration limits and additional buffers are reviewed quarterly. LCH.C Ltd takes legal, operational and foreign exchange risk into account when accepting cross-border collateral (CCP Standard 5.6). LCH.C Ltd operates its own online proprietary collateral management system (CMS) (CCP Standard 5.7).

In its 2013/14 Assessment, the Bank set a regulatory priority that LCH.C Ltd should consider accepting AUD cash as initial margin, in accordance with CCP Standard 5.2. A proposal to do so has since been approved under LCH.C Ltd's internal governance processes. The Bank expects LCH.C Ltd to proceed with its plans to accept AUD cash as initial margin, subject to approval by the relevant regulators.

5.1 A central counterparty should generally limit the assets it (routinely) accepts as collateral to those with low credit, liquidity and market risks.

The LCH.C Group Collateral Risk Policy sets out the principles for determining and reviewing the collateral that LCH.C Ltd accepts from its participants to cover margin requirements and default fund contributions. At a high level, the policy restricts eligible collateral to that which has low credit, liquidity and market risk. To further mitigate risk, LCH.C Ltd monitors the market value, credit quality and liquidity of collateral lodged on a daily basis.

Acceptable collateral

LCH.C Ltd accepts the following collateral from SwapClear participants:⁵⁵

- default fund contributions must be paid in GBP cash
- initial margin requirements can be met using eligible cash and non-cash collateral
- variation margin must be met in the currency of the underlying exposure
- intraday margin calls, which combine initial and variation margin, are paid in cash, but in limited circumstances can be met with securities.

Cash collateral. LCH.C Ltd accepts GBP, EUR and USD cash as initial margin. LCH.C Ltd also has the capacity to accept CAD, CHF, JPY, SEK, DKK and NOK cash as initial margin; although limits apply to how much of each currency LCH.C Ltd will accept.

Non-cash collateral. LCH.C Ltd currently accepts: sovereign debt of Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Norway, Spain, Sweden, the UK and the US; government guaranteed debt of Australia, Austria, France, Germany, the Netherlands and Sweden; securities issued by certain US and European Government agencies; and US Mortgage backed securities issued by the General National Mortgage Association.

LCH.C Ltd does not accept commercial or central bank guarantees.

The eligibility of new currencies and traded securities as collateral is determined by the LCH.C Ltd ERCo, in line with minimum criteria set out in the Collateral Risk Policy. These criteria require that consideration be given to the credit, market, liquidity, legal and operational risks associated with holding the collateral.

55 FCM members may only post cash collateral in USD. No additional restrictions apply to securities posted by FCM.

LCH.C Ltd monitors and manages risks associated with collateral to ensure that securities eligible as collateral are highly liquid and have low market and credit risk. If risks associated with a particular issuer of eligible collateral change significantly, LCH.C Ltd reserves the right to declare the collateral no longer acceptable.

The Collateral Risk Policy is owned by Group Risk. The appropriateness of the Collateral Risk Policy is reviewed by the LCH.C Ltd ERCo and the LCH.C Ltd Risk Committee, and approved by the Board, annually.

Wrong-way risk

LCH.C Ltd does not allow participants to post as collateral securities issued by themselves or by entities from the same group. In addition, wrong-way risk haircuts are applied if there is a strong correlation between LCH.C Ltd's potential exposure to the clearing participant and the value of the relevant collateral (e.g. the creditworthiness of the clearing participant and the issuer of the collateral are correlated due to sharing the same country of domicile).

Collateral and Liquidity Management (CaLM) Risk monitors wrong-way risk across clearing participant groups on a daily basis. LCH.C Ltd can require participants to reduce wrong-way risk exposures if necessary.

5.2 In determining its collateral policies, a central counterparty should take into consideration the broad effect of these policies on the market. As part of this, a central counterparty should consider allowing the use of collateral commonly accepted in the relevant jurisdictions in which it operates.

To provide flexibility in collateral eligibility, LCH.C Ltd accepts a range of currencies and traded securities as initial margin (see CCP Standard 5.1). LCH.C Ltd maintains on its website a list of collateral eligible for use in its SwapClear service.⁵⁶ Where possible, LCH.C Ltd notifies participants of changes to collateral eligibility in advance, to minimise any disruption from such changes. A process exists for participants to request LCH.C Ltd consider accepting additional forms of collateral.

In its 2013/14 Assessment, the Bank set a regulatory priority that LCH.C Ltd consider accepting AUD cash as initial margin, in accordance with CCP Standard 5.2. A proposal to do so has since been approved under LCH.C Ltd's internal governance processes. The Bank expects LCH.C Ltd to proceed with its plans to accept AUD cash as initial margin, subject to approval by the relevant regulators.

To ensure its collateral policy does not have a negative effect on the liquidity and price of acceptable collateral, LCH.C Ltd requires that traded securities it accepts as collateral have sufficient market liquidity. LCH.C Ltd also has an early warning indicator report that is run daily to monitor key risk indicators that affect funding liquidity. LCH.C Ltd does not accept securities close to maturity or subject to specific corporate events. Concentration limits are applied to the collateral each participant can post (see CCP Standard 5.5).

5.3 A central counterparty should establish prudent valuation practices and develop haircuts that are regularly tested and take into account stressed market conditions.

LCH.C Ltd marks collateral to market daily, using observed market prices from published sources. The LCH.C Group Collateral Risk Policy specifies minimum criteria regarding availability of pricing data for

⁵⁶ See <<http://www.swapclear.com/service/acceptable-collateral.html>>.

cash and non-cash collateral. There is a pricing data control framework in place to ensure the accuracy of data and for escalation of exceptions.

LCH.C Ltd applies base haircuts to all non-cash collateral posted. Base haircuts are set to cover the market risk associated with the securities posted as collateral, and are calibrated to cover 99.7 per cent of historical price moves, over a three-day holding period, using a 10-year look-back period. The three-day holding period captures the expected time lag between the last revaluation and a default, as well as the expected liquidation period. The 10-year look-back period aims to ensure that stressed market and liquidity conditions, such as the Euro area crisis in 2011–12, are factored into the haircuts. LCH.C Ltd also performs regular collateral haircut stress tests, and may apply a buffer, to ensure base haircuts will be sufficient in stressed market conditions.

Additional haircuts are applied to cover credit, wrong-way, concentration and liquidity, and foreign exchange risks. In the event that collateral issued by a particular security issuer is deemed to represent extra risk for the CCP, LCH.C Ltd may increase the additional haircuts and limit the amount of that collateral it will accept. Additional haircuts applied to cover wrong-way, concentration and liquidity, and foreign exchange risks are discussed under CCP Standards 5.1, 5.5 and 5.6, respectively.

Collateral haircuts and any additional buffers are reviewed by LCH.C Ltd on a quarterly basis or when there are material market moves that affect the valuation or liquidity of eligible collateral. Changes to haircuts must be approved by the LCH.C Ltd ERCo on recommendation from the ALCo. LCH.C Ltd's collateral haircut models are reviewed annually by an independent party (see CCP Standard 2.6).

5.4 In order to reduce the need for procyclical adjustments, a central counterparty should establish stable and conservative haircuts that are calibrated to include periods of stressed market conditions, to the extent practicable and prudent.

LCH.C Ltd's methodology for setting collateral haircuts is designed to establish stable and conservative haircuts. As discussed in CCP Standard 5.3, LCH.C Ltd calibrates haircuts to cover 99.7 per cent of historical price moves, using a 10-year look-back period. As noted, the look-back period ensures that stressed market and liquidity conditions, such as the Euro area crisis in 2011–12, are factored into the haircuts. LCH.C Ltd considers the potential procyclical effects of changing haircuts, if it is considering doing so, as part of the quarterly review process, and has the discretion to prevent haircuts from being lowered.

5.5 A central counterparty should avoid concentrated holdings of certain assets where this would significantly impair the ability to liquidate such assets quickly without significant adverse price effects.

Under the Group Collateral Risk Policy, LCH.C Ltd may address concentration and liquidity risk by applying:

- concentration limits to collateral posted by participants, either as caps on the percentage of margin requirements, or hard caps
- additional haircuts to concentrated positions, calibrated by extending the holding period beyond the three days that is typically assumed to be necessary to close out the position.

LCH.C Ltd monitors collateral concentration risks across a range of categories. LCH.C Ltd's Collateral Concentration Risk Procedure document identifies limits and thresholds for internal monitoring under a number of categories. Concentration limits and additional haircuts are reviewed by LCH.C Ltd on a quarterly basis.

5.6 A central counterparty that accepts cross-border collateral should mitigate the risks associated with its use and ensure that the collateral can be used in a timely manner.

When determining the eligibility of cross-border collateral, the LCH.C Ltd ERCo must consider all major risks, including legal, operational and foreign exchange risk, to ensure that collateral can be used in a timely manner.

Legal risk. LCH.C Ltd must be able to hold, and liquidate or convert cash and non-cash collateral to GBP, EUR or USD without legal challenge. LCH.C Ltd obtains legal advice regarding its ability to enforce its rights in respect of cross-border collateral, from all relevant jurisdictions. This advice is refreshed periodically.

Operational risk. For a currency or security to be accepted, LCH.C Ltd must have the operational capability to convert the currency into the ‘relevant currency’ (i.e. the currency used to settle liabilities in the event of a default), or realise the value of the security in the event of a default. To reduce the impact of any operational issue at a CSD, LCH.C Ltd maintains accounts with multiple CSDs and international CSDs (ICSDs).

Foreign exchange risk. LCH.C Ltd calculates all initial margin requirements in its base currency, GBP, using stressed foreign exchange rates. An additional foreign exchange haircut is applied to all collateral posted.

5.7 A central counterparty should use a collateral management system that is well designed and operationally flexible.

Collateral management system

LCH.C Ltd operates its own online proprietary CMS. Participants are able to input collateral proposal instructions and view balances and the status of instructions online. The CMS allows participants to send instructions to LCH.C Ltd to lodge, release, or substitute non-cash securities as collateral, and to deposit and withdraw cash. Triparty transactions can also be updated. LCH.C Ltd’s CMS is integrated with LCH.C Ltd’s back office.

The CMS is available for participants to view balances and input collateral instructions 24 hours per day. Instructions are processed by the collateral operations team between 7.00 am and 11.00 pm (UK time), and have been extended to between 8.00 am and 5.00 pm (Sydney time), in support of AUD concentration movements.

Re-use of collateral

LCH.C Ltd re-invests cash collateral received in line with its Investment Risk Policy (see CCP Standard 15.4). LCH.C Ltd does not re-use non-cash collateral except in the event of a default.

Standard 6: Margin

A central counterparty should cover its credit exposures to its participants for all products through an effective margin system that is risk based and regularly reviewed.

SwapClear applies variation, initial and additional margin to its credit exposures to its participants, using margin systems that are tailored to the particular attributes of the cleared products

(CCP Standard 6.1). LCH.C Ltd has access to timely price data, and has procedures to address situations in which price data are not readily available or reliable (CCP Standard 6.2). SwapClear's initial margin model aims to cover price changes over the expected close-out period with 99.7 per cent confidence, and includes measures intended to reduce the need for procyclical changes (CCP Standard 6.3). SwapClear's initial margin model recognises offsets between SwapClear products, but not between SwapClear and LCH.C Ltd's other services (CCP Standard 6.5). SwapClear calls variation margin daily and makes scheduled and ad-hoc intraday margin calls (CCP Standard 6.4). SwapClear assesses the performance of its initial margin model with daily backtesting and quarterly sensitivity analysis (CCP Standard 6.6). The Independent Model Validation team conducts annual validations of SwapClear's margin model (CCP Standard 6.7). LCH.C Ltd's margin systems are designed to take into account the operating hours of related payment and settlement systems (CCP Standard 6.8).

6.1 A central counterparty should have a margin system that establishes margin levels commensurate with the risks and particular attributes of each product, portfolio and market it serves.

All SwapClear positions are marked to market on at least a daily basis. Variation margin is collected from clearing participants that have experienced a mark-to-market loss and paid to those with a mark-to-market gain. This practice ensures that LCH.C Ltd's valuations of SwapClear participant positions remain current and that observed uncovered losses do not accrue over time.

SwapClear requires clearing participants to post initial margin on all positions. Initial margin requirements aim to cover, with single-tailed confidence of at least 99.7 per cent, the risk of a fall in the value of a participant's outstanding portfolio with the CCP during the expected closeout period of five days (seven days for client accounts) should that participant default. SwapClear sets initial margin requirements using its PAIRS model, which uses the 'historical expected shortfall' methodology (see CCP Standard 6.3).

SwapClear calls initial margin and variation margin after the end of each business day. Additionally, SwapClear makes combined variation margin and initial margin calls intraday if a participant's combined variation margin and initial margin liability exceeds a predetermined threshold (see CCP Standard 6.4).

Additional Margin

Further to the margin it calculates using the base PAIRS model, LCH.C Ltd collects additional margin in SwapClear to cover risks not fully captured by the model. This includes liquidity margin, credit multiplier margin, and basis risk additional margin, which are described below. LCH.C Ltd also collects 'margin floor add on' to reduce the potential for procyclical increases in initial margin (see CCP Standard 6.3), as well as daily and monthly DFAM (see CCP Standard 4.7).

Counterparty risk multiplier margin is called on a daily basis where a participant's ICS rises above a predetermined threshold. The multiplier is applied to both the house and client accounts of the participant. The amount called is the larger of: a specified percentage of the account's initial margin; or a specified percentage of the account's STLOIM. The percentages used are increasing in the participant's ICS.

Liquidity add-on (also called 'initial margin multiplier') aims to cover the risk of closing out a portfolio that is large relative to the market. In a default event, the sale of a large portfolio may have a market impact, which would increase LCH.C Ltd's losses in the DMP. Liquidity add-on is calculated on a 'per

account' basis. The liquidity add-on requirement for a house or client account is calculated as the larger of:

- Currency liquidity margin, which is based on an estimate of the price impact of hedging the relevant portfolio. The estimate is made using results from a survey of participants about the ability of the market to absorb large trades.
- Concentration margin, which is based on initial margin and is intended to apply to portfolios that are large relative to the market. Concentration margin is applied to accounts with initial margin requirements above a predetermined threshold and is set as a percentage of the initial margin requirement, with the percentage rising from 30 per cent to 100 per cent.

SwapClear calculates a liquidity margin requirement for each house and client account at the end of each day, and calls the required liquidity margin the next morning.⁵⁷

Basis risk add-on is used to cover two risks that are not directly captured by the initial margin model: tenor basis risk, which is the risk that the curves for different tenors of an interbank offer rate will move relative to each other; and overnight index swap (OIS) discounting risk, which is the risk that the value of an interest rate swap priced using OIS discounting will vary relative to the value of the same swap priced using LIBOR discounting. Basis risk add-on is calculated at the end of each day, with the incremental change called the next morning.

LCH.C Ltd has powers to call any additional margin it determines is required to cover risks that are not adequately captured by its existing margin models. For example, LCH.C Ltd called additional margin from Spanish and Italian participants during the Eurozone sovereign debt crisis.

6.2 A central counterparty should have a reliable source of timely price data for its margin system. A central counterparty should also have procedures and sound valuation models for addressing circumstances in which pricing data are not readily available or reliable.

SwapClear receives data on zero-coupon yield curves, inflation curves, and exchange rates throughout each business day in order to calculate its daily initial margin calls (see CCP Standard 6.3) and daily variation margin calls (see CCP Standard 6.4). SwapClear also receives updated yield curve and inflation curve data at three scheduled times each day (8.20 am; 2.15 pm; and 7.05 pm UK time), and can obtain updated data on an ad hoc basis at other times. SwapClear uses these data to re-calculate variation margin and initial margin requirements at the house and client account level. If the combined payment implied by those two requirements exceeds participant-specific thresholds, SwapClear will make an intraday margin call (see CCP Standard 6.4).

LCH.C Ltd receives data on interest rate swaps from banks and brokers via Reuters and Bloomberg. Upon receipt, each quote is subject to validation checks to ensure that bid and ask prices are quoted correctly and that each price is within a predefined range relative to the previous price received. LCH.C Ltd receives data on inflation swaps from participants active in inflation swaps. LCH.C Ltd ensures the quality of the inflation swaps data by a 'crossing mechanism', whereby clearing participants can be required to trade on prices submitted to the CCP if they repeatedly submit bad data.

⁵⁷ A set of affiliated participants exposed to similar risks may have a net position that is large relative to the market. This risk may not be captured by the liquidity margin requirements calculated for individual house and client accounts. SwapClear may call 'group add-on' to mitigate this risk.

Under circumstances in which a data point is deemed inaccurate or is not available, a proxy data point will be substituted. If possible, this proxy data point will be taken from alternative data sources. Otherwise, LCH.C Ltd could use the previous day's observation.

6.3 A central counterparty should adopt initial margin models and parameters that are risk based and generate margin requirements sufficient to cover its potential future exposure to participants in the interval between the last margin collection and the close out of positions following a participant default. Initial margin should meet an established single-tailed confidence level of at least 99 per cent with respect to the estimated distribution of future exposure. For a central counterparty that calculates margin at the portfolio level, this requirement applies to each portfolio's distribution of future exposure. For a central counterparty that calculates margin at more granular levels, such as at the sub-portfolio level or by product, the requirement should be met for corresponding distributions of future exposure. The model should: use a conservative estimate of the time horizons for the effective hedging or close out of the particular types of products cleared by the central counterparty (including in stressed market conditions); have an appropriate method for measuring credit exposure that accounts for relevant product risk factors and portfolio effects across products; and to the extent practicable and prudent, limit the need for destabilising, procyclical changes.

Initial margin requirements in SwapClear are calculated using its PAIRS model. The initial margin requirement for each participant's house account aims to cover, with single-tailed confidence of at least 99.7 per cent, the losses that SwapClear could incur on that house account over a five-day period if that participant defaulted. The initial margin requirement on client accounts is calculated in the same way, except they are scaled up to cover a seven-day holding period.⁵⁸ The longer assumed close-out period for client accounts is to allow for time to decide on and execute porting of the client's positions to another clearing participant.

The PAIRS model calculates the change in the price of each account that would occur under a range of scaled historical scenarios. Each scenario is a set of movements in zero-coupon yield curves, inflation curves and exchange rates that occurred in a five-day interval during the 10-year look-back period. LCH.C Ltd uses the 2 500 most recent overlapping five-day periods, i.e. a look-back period of approximately 10 years. The yield curve, inflation curve and exchange rate movements in each scenario are scaled up (down) if current volatility is high (low) relative to volatility at the time of the scenario. The initial margin requirement is then set equal to the average of the 6 worst losses from the 2 500 scenarios, which is the average loss conditional on being at or below the 0.24th percentile of the distribution of profit-and-loss.

SwapClear's initial margin methodology contains features intended to reduce the potential for procyclical initial margin changes, including the use of a long look-back period and a slow moving measure of volatility. The measure of volatility is an exponentially weighted moving average with a high decay parameter (0.992), so it places a fairly high weight on past observations.

As an additional measure to mitigate procyclicality and ensure initial margin is above minimum levels required under EMIR, LCH.C Ltd has established an initial margin floor. The floor is calibrated to cover potential losses over a five-day holding period with 99.5 per cent confidence, based on a 10-year look-

⁵⁸ LCH.C Ltd calculates the initial margin requirement using five-day returns, and then multiplies that requirement by $\sqrt{7/5}$. LCH.C Ltd has found that this approach results in fewer backtesting breaches than calculating the initial margin requirement using seven-day returns.

back period, with no scaling based on volatility. LCH.C Ltd calculates the margin floor corresponding to the portfolio of each house and client account on a daily basis. SwapClear calls 'margin floor add-on' on a daily basis from each house or client account with initial margin below the floor, to bring the account's initial margin plus add-on up to the floor.

LCH.C Ltd has incorporated inflation rate derivatives into the existing SwapClear initial margin methodology. LCH.C Ltd also charges additional liquidity margin on all inflation rate derivative positions, with no offsets permitted between tenor buckets or between inflation rate derivatives and IRDs denominated in the same currency. Additional hypothetical portfolios have been added to LCH.C Ltd's backtesting and sensitivity analysis procedures to ensure these procedures are comprehensive and consistent over time (see CCP Standard 6.6).

6.4 A central counterparty should mark participant positions to market and collect variation margin at least daily to limit the build-up of current exposures. A central counterparty should have the authority and operational capacity to make intraday margin calls and payments, both scheduled and unscheduled, to participants.

All SwapClear positions are marked to market on at least a daily basis (see CCP Standard 6.1).

SwapClear collects 'price alignment interest' (calculated daily and paid monthly) from participants that have received variation margin and pays it to participants that have paid variation margin. Participants that receive variation margin can invest that cash to earn a return, while participants that post variation margin forgo the return they would have earned absent the payment. Price alignment interest is needed to ensure the fair price of the swap is unaffected by the fact that variation margin is exchanged. Price alignment interest in each currency is calculated using the relevant overnight rate, such as the Federal Funds rate for USD.

SwapClear calls and receives daily variation margin and initial margin on the same schedule. After the SwapClear service closes at midnight UK time, SwapClear uses updated yield curve, inflation curve and exchange rate data to calculate the variation and initial margin requirement for each house or client account. While SwapClear is closed, SwapClear informs each participant of the amount of variation margin that it must post on each account when the service opens. A participant's PPS bank must provide LCH.C Ltd with confirmation that it will pay the amounts required by 9.00 am UK time (see also CCP Standard 9). If a participant's PPS bank does not provide confirmation in time, LCH.C Ltd will discuss the issue with the participant. The LCH.C Ltd default rules provide LCH.C Ltd with the power to declare a participant to be in default if the participant fails to make a payment when due.

SwapClear receives updated yield curve and inflation curve data at three scheduled times intraday (8.20 am; 2.15 pm; and 7.05 pm UK time), and can obtain updated data at other times on an ad hoc basis. Following each intraday update to its data, SwapClear re-calculates the variation margin and initial margin requirements of house and client accounts. SwapClear then calculates the payment, if any, required to fully collateralise these two requirements. A participant will be called for intraday margin if the sum of the payment obligations on its house and client accounts exceeds its 'credit tolerance'. Credit tolerances are set as a proportion of the participant's initial margin, subject to an absolute cap and floor. LCH.C Ltd assigns higher credit tolerances to participants with better ICSs, with the highest credit tolerance set at 8 per cent of initial margin, capped at £50 million.

6.5 In calculating margin requirements, a central counterparty may allow offsets or reductions in required margin across products that it clears or between products that it and another central counterparty clear, if the risk of one product is significantly and reliably correlated with the risk of the other product. Where a central counterparty enters into a cross-

margining arrangement with one or more other central counterparties, appropriate safeguards should be put in place and steps should be taken to harmonise overall risk management systems. Prior to entering into such an arrangement, a central counterparty should consult with the Reserve Bank.

SwapClear's PAIRS model calculates the profit-and-loss a portfolio would experience under the zero-coupon yield curve, inflation curve and exchange rate changes observed in each of the five-day intervals over the look-back period (see CCP Standard 6.2). In doing so, it recognises fully the correlations between different zero-coupon yield curves, inflation curves and exchange rates. LCH.C Ltd has provided evidence that there are economic relationships between its yield curves, inflation curves and exchange rates, and that the correlations between them are reliably present.

LCH.C Ltd allows netting of initial margin between a clearing participant's inflation rate derivative and IRD portfolios. LCH.C Ltd has provided evidence that there is an economic relationship between interest rates and inflation, and that the correlation between them is reliably present. In addition, LCH.C Ltd has conducted backtesting on hypothetical portfolios of inflation rate derivatives and IRDs to ensure such netting provides sufficiently conservative outcomes (see CCP Standard 6.6).

LCH.C Ltd does not currently allow margin offsets between SwapClear and LCH.C Ltd's other clearing services. In March 2015, LCH.C Ltd announced it intended to launch interest rate portfolio margining capabilities between the SwapClear service and its listed interest rate derivatives service.⁵⁹ The Bank will continue to monitor the development of this service, including in relation to LCH.C Ltd's compliance with CCP Standard 6.

LCH.C Ltd does not currently have any cross-margining arrangements with any other CCPs for SwapClear.

6.6 A central counterparty should analyse and monitor its model performance and overall margin coverage by conducting rigorous daily backtesting and at least monthly, and more frequent where appropriate, sensitivity analysis. A central counterparty should regularly conduct an assessment of the theoretical and empirical properties of its margin model for all products it clears. In conducting sensitivity analysis of the model's coverage, a central counterparty should take into account a wide range of parameters and assumptions that reflect possible market conditions, including the most volatile periods that have been experienced by the markets it serves and extreme changes in the correlations between prices.

SwapClear conducts daily backtesting to test the adequacy of its initial margin requirements. SwapClear conducts quarterly sensitivity analyses to assess the validity of the assumptions of its initial margin model, comparing the model's performance when individual assumptions are varied holding others constant.

Backtesting

SwapClear conducts daily backtests to assess whether its initial margin requirements achieve 99.7 per cent coverage as intended. According to daily backtests, SwapClear's initial margin methodology achieved 99.96 per cent coverage in the 18 months to September 2015.

⁵⁹ The proposed portfolio margining service will not initially include AUD products and Australian clearing participants will not initially use the service.

SwapClear conducts backtesting on observed positions in individual house and client accounts, and on hypothetical portfolios.⁶⁰ A 'backtesting breach' occurs if the initial margin requirement calculated on an end-of-day portfolio would have been insufficient to cover the 'clean' profit-and-loss of the account over any of the multiday periods of a length up to the holding period. The clean profit-and-loss of an account is the profit-and-loss the account's portfolio would have made over a multiday period, had the portfolio remained unchanged throughout that period.

SwapClear produces daily and monthly backtesting reports. Both reports analyse the backtest results through 'business backtesting' and statistical analysis, though the monthly reports are more detailed. In business backtesting, SwapClear compares the number of observed breaches with the number of expected breaches given the targeted coverage level. The statistical tests are used to determine whether the deviation in the number of breaches from the theoretically expected level is statistically significant. Backtesting results are reported monthly to the MRMC and LCH.C Ltd ERCo, and quarterly to the LCH.C Ltd Risk Committee.

Backtesting results would prompt investigation by SwapClear risk management if SwapClear's initial margin model falls below the targeted coverage, fails a statistical test, or results in initial margin shortfalls for particular products or market conditions. Based on such an investigation, the LCH.C Group CRO, the Group Head of Market Risk, or the LCH.C Ltd CRO may choose to take participant-specific action, such as calling additional margin, or may initiate a review of the underlying initial margin methodology.

Sensitivity analysis

SwapClear conducts quarterly sensitivity analysis of its initial margin model.⁶¹ Sensitivity analysis assesses the validity of the assumptions made in the initial margin model, typically by comparing the output and performance of the model as individual assumptions are changed while holding other assumptions constant. The assumptions tested include: the use of absolute versus relative returns; stationarity of returns; correlations; and different methods of volatility scaling. SwapClear assesses the model's performance on actual house and client portfolios as at the date of the report, as well as on hypothetical portfolios exposed to specific risk factors.

The results are reviewed by the MRMC on a quarterly basis, and can be escalated to the LCH.C Ltd ERCo. In addition, sensitivity analysis may form part of the annual review of the initial margin model. Any changes to the initial margin model prompted by sensitivity analysis would go through the usual model governance procedures.

The sensitivity analysis of SwapClear's initial margin model conducted in June 2015 indicated no cause for changes to the current model.

6.7 A central counterparty should regularly review and validate its margin system.

The LCH.C Group Model Governance, Validation and Review Policy requires that the Independent Model Validation team conduct annual validations of SwapClear's margin model. The policy also requires that a validation be performed whenever a new margin model is adopted or a material change is made to an existing margin model (see CCP Standard 2.6). SwapClear's initial margin model

60 Backtesting was performed for each of the inflation rate derivatives LCH.C Ltd clears prior to launch. Additional hypothetical portfolios consisting of common trades in inflation rate derivatives as well as IRDs have been added to reflect the introduction of this product.

61 The frequency of sensitivity analysis changed during the Assessment period; sensitivity analysis was previously conducted on a monthly basis. LCH.C Ltd has stated that this change was prompted by management demand for additional analysis as well as a desire to maintain consistency with LCH.C Group Risk policies.

is also subject to daily backtesting and quarterly sensitivity analysis (CCP Standard 6.6). The Independent Model Validation team last validated SwapClear's initial margin, portfolio-margin add-on, basis risk add-on, curve construction and inflation product performance in July 2015. The validation did not find any reason to conclude that the reviewed margin model was unsatisfactory, though it did specify a few low priority required actions, which SwapClear is implementing.

SwapClear provides a high level description of its initial margin model on its website. SwapClear also provides participants with a tool that enables them to estimate the initial margin requirement that would result from hypothetical portfolios specified by the user, which assists participants to manage their risk and funding.

6.8 In designing its margin system, a central counterparty should consider the operating hours of payment and settlement systems in the markets in which it operates.

LCH.C Ltd settles all margin payments through its PPS (see CCP Standard 9). The PPS operates in the UK from 9.00 am to 4.00 pm UK time, and then in the US from 4.00 pm to 9.00 pm UK time. These times reflect the operating times of the relevant payments systems in the UK and US and the currency cut-off times of the PPS banks. Intraday margin calls via the US PPS and calls in the UK between 2.30 pm and 4.00 pm UK time will be called in USD to account for the liquidity and operating hours of relevant currency markets and payment and settlement systems. As noted in CCP Standard 6.4, SwapClear makes intraday margin calls following its three scheduled market data updates (8.20 am; 2.15 pm; and 7.05 pm UK time) in the event exposures exceed participant-specific tolerances. These times are designed to capture the London market open, New York morning economic releases and US afternoon.

LCH.C Ltd is currently working to establish new Australian PPS arrangements (see CCP Standard 9). Under these arrangements, 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 Exchange Settlement Account (ESA), to become a PPS bank and to use those PPS arrangements to settle its AUD obligations across its ESA (i.e. to self-PPS) (see CCP Standard 9.1). Other clearing participants would still be able to make AUD payments via the existing UK PPS arrangements, which would operate in parallel to the Australian system. Under the Australian PPS, payment instructions would be made during the Sydney business day. LCH.C Ltd is also seeking regulatory approval regarding a proposal to accept AUD cash for initial margin purposes via the Australian PPS (see CCP Standard 5.2). Under the proposed arrangements, clearing participants that have established PPS arrangements under the Australian PPS would be able to input AUD cash deposit/withdrawal instructions during the Sydney business day. LCH.C Ltd already accepts AUD-denominated government securities as initial margin, through EuroClear and Clearstream; LCH.C Ltd is also considering accepting this collateral from participants in Austraclear.

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 maintains a robust framework for managing its liquidity risks (CCP Standard 7.1). LCH.C Ltd manages liquidity risk across the CCP as a whole (rather than at a service level). LCH.C Ltd has operational and analytical systems in place to measure and monitor its settlement and funding flows (CCP Standard 7.2). LCH.C Ltd seeks to maintain sufficient liquid resources by setting daily operational liquidity targets (which reflect business-as-usual requirements) and a default liquidity requirement (which reflects 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). Together, these form LCH.C Ltd's total liquidity requirement; LCH.C Ltd's internal policies require that available liquidity resources relative to its total liquidity requirement be above 100 per cent and a buffer amount (CCP Standard 7.3). LCH.C Ltd uses liquidity stress tests to determine the size of its default liquidity requirements (CCP Standard 7.8).

LCH.C Ltd's primary sources of liquidity are cash posted by its clearing participants and LCH.C Ltd's own capital. Cash is invested in accordance with the LCH.C Group Investment Risk Policy, and LCH.C Ltd has arrangements in place to convert its investments and collateral held in custody into cash in a timely manner (CCP Standard 7.4 and 7.6). LCH.C Ltd also has arrangements in place to manage its AUD liquidity risk. As part of these arrangements, LCH.C Ltd holds collateral eligible for repo with the Bank in its Austraclear account sufficient to cover its estimated AUD liquidity needs in the event of the default of the two clearing participants and their affiliates with the largest AUD obligations in stressed market conditions (CCP Standard 7.4). LCH.C Ltd uses its ESA to settle its AUD obligations, consistent with the Bank's regulatory priority for LCH.C Ltd (CCP Standard 7.7). LCH.C Ltd has explicit rules and procedures that set out the actions it would take to address a liquidity shortfall or to replenish its liquidity resources (CCP Standard 7.9).

7.1 A central counterparty should have a robust framework to manage its liquidity risks from its participants, commercial bank money settlement agents, nostro agents, custodians, liquidity providers and other entities.

Sources of liquidity risk

LCH.C Ltd manages liquidity risk in accordance with a LCH.C Group Liquidity Risk Policy. The policy is written by the LCH.C Group Risk department and approved by LCH.C Ltd's Board. LCH.C Ltd also maintains a Liquidity Plan, which describes the principles and procedures that it applies to meet the Group Liquidity Risk Policy. Both the Liquidity Risk Policy and the Liquidity Plan are reviewed annually. Each CCP within LCH.C Group must be able to meet its own liquidity requirements independently from other CCPs in the Group. Within LCH.C Ltd, liquidity is managed at a cross-service level – that is, liquidity from one clearing service can be used to meet liquidity requirements in other clearing services.

LCH.C Ltd has identified two main sources of liquidity needs:

- *Operational liquidity needs* – 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 needs* – that is, liquidity requirements in the event of the default of a clearing participant. These include: fulfilment of settlement obligations of the defaulting participant (these primarily arise from the RepoClear and EquityClear services); posting variation margin to

non-defaulting participants; potential shortfalls due to losses arising from liquidation of cleared positions and collateral; and potential shortfalls due to investment losses if the defaulting participant is also an investment counterparty.

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

Other potential draws on liquidity include disruptions in liquidity markets, which could impair LCH.C Ltd's ability to liquidate its assets, and disruptions in settlement and payment flows related to issues at PPS banks.

Managing liquidity risk

LCH.C Ltd prevents the build-up of large liquidity (and credit) exposures to participants by calling variation margin, including on an intraday basis. LCH.C Ltd's framework for managing its remaining liquidity risks includes the use of operational and analytical tools to measure and monitor its settlement and funding flows (see CCP Standard 7.2), as well as daily and intraday liquidity stress testing (see CCP Standard 7.8). LCH.C Ltd maintains sufficient liquid resources to meet business-as-usual needs as well as obligations that could arise in the event of the default of the two clearing participants and their affiliates with the largest aggregate payments obligations to the CCP (see CCP Standard 7.3), with reference to stress testing.

LCH.C Ltd also provides participants with information to assist them to manage their liquidity needs. For example, a tool is provided to participants to assist them in calculating their initial margin, initial margin multiplier, basis risk and margin floor add-on (see CCP Standards 6.1 and 6.3). Participants are typically warned by LCH.C Ltd if they are close to being called for DFAM (see CCP Standard 4.7). In addition, LCH.C Ltd imposes limits on the proportion of non-cash collateral that participants can post and seeks to provide advanced warning, if possible, if participants are required to swap lodged non-cash collateral for cash.

7.2 A central counterparty should have effective operational and analytical tools to identify, measure and monitor its settlement and funding flows on an ongoing and timely basis, including its use of intraday liquidity.

Liquidity management is primarily the responsibility of the CaLM function. CaLM uses LCH.C Ltd's core banking system, Calypso, to manage and monitor LCH.C Ltd's liquidity needs and its access to resources. CaLM manages LCH.C Ltd's cash portfolio so that it can meet expected and unexpected operational liquidity outflows. At the start of each day, CaLM has visibility over the liquidity available, which incorporates overnight margin and maturing investments, and also potential operational liquidity outflows, such as advised collateral substitutions and the amount of excess cash that clearing participants have requested be repaid. This monitoring can also potentially provide an early warning of default of a clearing participant or PPS bank. LCH.C Ltd sets various timing cut-offs for participants to request the return of cash and, therefore, from a certain point in the day, there are only inflows of liquidity. CaLM is then able to make informed decisions about investing excess cash.

Collateral Operations monitors LCH.C Ltd's intraday liquidity usage by monitoring balances at commercial concentration banks using SWIFT messages every 15 minutes.

LCH.C Ltd maintains a minimum liquidity coverage ratio (LCR), which is the ratio of available liquid assets to stressed liquidity requirements (see CCP Standard 7.3). The LCR is calculated and monitored on both an end-of-day and intraday basis.

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.

To ensure that LCH.C Ltd maintains sufficient liquid resources to meet its obligations, it sets daily 'operational liquidity targets' and a 'default liquidity requirement':

- *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 (see CCP Standard 7.8). 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 within LCH.C Ltd, assuming complete closure of the foreign exchange markets. Liquidity stress testing is conducted by LCH.C Ltd's CaLRM function.

Together, these form LCH.C Ltd's total liquidity requirement. LCH.C Ltd's internal policies require it to 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.

As noted in CCP Standard 7.2, monitoring the LCR, as well as other day-to-day management of liquidity risk, is the responsibility of CaLRM. Any breaches of the LCR must be notified to the ALCo and LCH.C Ltd ERCo, and the 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 value of available liquid resources above the stressed liquidity requirement (known as the liquidity buffer). A material reduction in the value of the liquidity buffer must be immediately reported to the LCH.C Ltd 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.

Liquidity needs in currencies that are less actively traded in LCH.C Ltd (which include AUD) 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 and provides coverage of around

99.7 per cent of the distribution of price movements. Observed increases in operational flows or potential exposures in these currencies are investigated by CaLRM and reported to the ALCo, as required. During the Assessment period, LCH.C Ltd introduced a specific framework to manage its AUD liquidity risk; this is discussed in detail in CCP Standard 7.4.

7.4 For the purpose of meeting its minimum liquid resource requirement, a central counterparty's qualifying liquid resources in each currency include cash at the central bank of issue and at creditworthy commercial banks, committed lines of credit, committed foreign exchange swaps and committed repos, as well as highly marketable collateral held in custody and investments that are readily available and convertible into cash with prearranged and highly reliable funding arrangements, even in extreme but plausible market conditions. If a central counterparty has access to routine credit at the central bank of issue, the central counterparty may count such access as part of the minimum requirement to the extent it has collateral that is eligible for pledging to (or for conducting other appropriate forms of transactions with) the relevant central bank. All such resources should be available when needed.

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 predominantly in very short dated transactions with daily maturities, as well as in highly liquid government securities, in accordance with the LCH.C Group Investment Policy (see CCP Standard 15).

LCH.C Ltd has arrangements in place to convert its investments and collateral held in custody into cash in a timely manner. It has established Global Master Repurchase Agreements (GMRAs) with a number of highly rated counterparties and regularly determines the amount of liquidity that could be raised with those counterparties (see CCP Standard 7.6). LCH.C Ltd can also seek additional liquidity by selling collateral it holds outright.

LCH.C Ltd has holdings of liquid resources in those minor currencies that it accepts as initial margin.

LCH.C Ltd has arrangements in place with a number of highly rated counterparties to undertake foreign exchange transactions, allowing it to use surplus liquidity in a particular currency to mobilise liquidity in different currencies.

LCH.C Ltd has informed the Bank that it would seek to draw on central bank liquidity where available and when required. In accordance with the Bank's regulatory priorities, during the Assessment period, LCH.C Ltd established an ESA at the Bank. The ESA can be used to generate intraday AUD liquidity in exchange for Bank-eligible securities. This facility can be extended overnight, although the Bank expects that LCH.C Ltd would attempt to seek to generate liquidity in the market before seeking it from the Bank on an overnight basis. LCH.C Ltd's use of its ESA is discussed further in CCP Standard 9.

Australian dollar liquidity framework

In accordance with the Bank's regulatory priorities, during the Assessment period LCH.C Ltd established a framework to manage its AUD liquidity risk. To support its operation of its ESA, LCH.C Ltd also opened an Austraclear account. LCH.C Ltd holds collateral eligible for repo with the Bank in its Austraclear account sufficient to cover its estimated AUD liquidity needs in the event of the default of the two clearing participants and their affiliates with the largest AUD obligations in 'stressed' market conditions. LCH.C Ltd estimates this requirement as the sum of the SwapClear

‘worst case loss’ (using its standard methodology for monitoring less actively traded currencies, as discussed in CCP Standard 7.3) and any operational outflows (buy side settlements and cash-to-non-cash switches) for the two largest clearing participants and their affiliates. This provides coverage of around 99.7 per cent of the distribution of price movements. In the event that it needed to access AUD liquidity, LCH.C Ltd would seek to repo this collateral with market counterparts; LCH.C Ltd has established GMRA with a number of market participants to facilitate this. In the event that it could not liquidate the collateral in the market, LCH.C Ltd could repo the collateral to the Bank under the Bank’s standard terms.

In the event that LCH.C Ltd’s AUD liquidity needs exceeded the value it could access using its AUD collateral, it would seek further liquidity by entering into foreign exchange (FX) swaps with market participants using surplus liquidity from other currencies. As discussed in CCP Standard 7.3, LCH.C Ltd conducts stress testing at an aggregated level across all currencies to ensure it has sufficient liquidity in the event of the default of the two largest clearing participants and their affiliates giving rise to the largest payment obligations in extreme but plausible conditions.

7.5 A central counterparty may supplement its qualifying liquid resources with other forms of liquid resources. If the central counterparty does so, these liquid resources should be in the form of assets that are likely to be saleable or acceptable as collateral for lines of credit, swaps or repos on an ad hoc basis following a default, even if this cannot be reliably prearranged or guaranteed in extreme market conditions. Even if a central counterparty does not have access to routine central bank credit, it should still take account of what collateral is typically accepted by the relevant central bank, as such assets may be more likely to be liquid in stressed circumstances. A central counterparty should not assume the availability of emergency central bank credit as part of its liquidity plan.

LCH.C Ltd has access to various forms of non-qualifying liquid resources, including uncommitted credit lines with commercial banks and uncommitted access to intraday liquidity at CSDs and ICSDs (which could potentially be extended overnight). LCH.C Ltd regularly uses intraday liquidity facilities at CSDs and ICSDs to support business-as-usual settlement. Nonetheless, LCH.C Ltd has informed the Bank that it would not need to rely on any of these resources (or on the provision of central bank credit) to meet its stressed liquidity needs (as defined in CCP Standard 7.3).

7.6 A central counterparty should obtain a high degree of confidence, through rigorous due diligence, that each provider of its minimum required qualifying liquid resources, whether a participant of the central counterparty or an external party, has sufficient information to understand and to manage its associated liquidity risks, and that it has the capacity to perform as required under its commitment. Where relevant to assessing a liquidity provider's performance reliability with respect to a particular currency, a liquidity provider's potential access to credit from the central bank of issue may be taken into account. A central counterparty should regularly test its procedures for accessing its liquid resources at a liquidity provider.

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). Nonetheless, other tools that LCH.C Ltd would

use are not applied on a day-to-day basis (e.g. repo, borrowing, FX transactions).⁶² As noted in CCP Standard 7.4, LCH.C Ltd has GMRAs in place with a number of highly-rated counterparties to undertake repos. To ensure that it could access liquidity using these tools, LCH.C Ltd conducts regular 'war games'. One aspect of these tests is that LCH.C Ltd conducts a capacity testing exercise with entities with which it has GMRAs in place to test the amount of liquidity that LCH.C Ltd could raise under repo. LCH.C Ltd also simulates the liquidation of a defaulting clearing participant's collateral by asking counterparties to show hypothetical bid prices. These tests are conducted by CaLM quarterly on a rolling basis, so that LCH.C Ltd tests its ability to apply each tool at least once a year.

7.7 A central counterparty with access to central bank accounts, payment services or securities services should use these services, where practical, to enhance its management of liquidity risk. A central counterparty that the Reserve Bank determines to be systemically important in Australia and has obligations in Australian dollars should operate its own Exchange Settlement Account, in its own name or that of a related body corporate acceptable to the Reserve Bank, to enhance its management of Australian dollar liquidity risk.

LCH.C Ltd began using its ESA to make the final stage of its AUD payments (i.e. settlement of AUD variation margin between LCH.C Ltd and its clearing participants' settlement banks (i.e. PPS banks)) from end March 2015. This is consistent with the Bank's regulatory priority for LCH.C Ltd. As noted in CCP Standard 7.3, LCH.C Ltd holds collateral eligible for repo with the Bank in an Austraclear account in its own name. LCH.C Ltd uses this collateral to generate liquidity in its ESA using the Bank's intraday repo facility to manage its AUD settlements, which allows it to pay out AUD variation margin prior to receiving all inward margin payments. LCH.C Ltd would also have access to overnight liquidity from the Bank under standard terms, although it would attempt to raise liquidity from market counterparts before seeking access to liquidity from the Bank on an overnight basis.

LCH.C Ltd has accounts with the BoE (for concentration of GBP and EUR), the Bank of Canada (for concentration of CAD) and the Swiss National Bank (for concentration of CHF). LCH.C Ltd has informed the Bank that it favours the use of central bank facilities if they are practical and available and is in discussions to open accounts with other central banks.

7.8 A central counterparty should determine the amount and regularly test the sufficiency of its liquid resources through rigorous stress testing. A central counterparty should have clear procedures to report the results of its stress tests to appropriate decision-makers at the central counterparty and to use these results to evaluate the adequacy of, and adjust, its liquidity risk management framework. In conducting stress testing, a central counterparty should consider a wide range of relevant scenarios. Scenarios should include relevant peak historic price volatilities, shifts in other market factors such as price determinants and yield curves, multiple defaults over various time horizons, simultaneous pressures in funding and asset markets, and a spectrum of forward-looking stress scenarios in a variety of extreme but plausible market conditions. Scenarios should also take into account the design and operation of the central counterparty, include all entities that might pose material liquidity risks to the central counterparty (such as commercial bank money settlement agents, nostro agents, custodians, liquidity providers and linked FMIs) and, where appropriate, cover a multiday period. In all cases, a central counterparty should document its supporting

⁶² For clarity, repo describes the exchange of securities for cash, as opposed to reverse repo, which is the exchange of cash for securities. LCH.C Ltd performs reverse repo on a business-as-usual basis.

rationale for, and should have appropriate governance arrangements relating to, the amount and form of total liquid resources it maintains.

LCH.C Ltd runs liquidity stress tests to forecast liquidity requirements that could arise over a 30-day liquidity horizon following the default of the two clearing participants and their affiliates giving rise to the largest liquidity requirements (the cover two liquidity stress tests). The tests are conducted separately for LCH.C Ltd's three material currencies (GBP, EUR and USD) and in aggregate over all currencies. The tests are run daily at end-of-day and at four times intraday. The tests cover all liquidity risks related to clearing participants and their affiliates, including settlement obligations, variation margin requirements and shortfalls arising from investment losses (which would arise if the defaulter was also a LCH.C Ltd investment counterparty). The liquidity stress tests are used to determine the default liquidity requirement.

- *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.
- *Variation margin requirements:* Similar to settlement obligations, LCH.C Ltd needs to ensure that sufficient liquidity is available to cover potential variation margin losses on the defaulting participant's portfolio before exposures are fully closed out. The total initial margin requirements of the two largest clearing participants in each service are used to model its cover two variation margin outflows. It is assumed there is no offsetting of variation margin payments across services (this methodology is discussed further below).

In addition to the cover two liquidity stress tests, LCH.C Ltd also runs several additional extreme but plausible stress-test scenarios, which target events that are considered to have a probability of up to once in 30 years. These scenarios model the impact of restricted access to liquid resources due to closure of certain parts of the repo market, the impact of a regional economic crisis and the default of multiple clearing participants. The results of these additional stress tests are used for management information.

The development and implementation of the liquidity stress-testing models (and the liquidity risk management framework more generally) is undertaken by CaLRM and subject to oversight by the ALCo and LCH.C Ltd ERCo. CaLRM reviews the results from liquidity stress testing each day. It also conducts an internal model review each quarter (and more frequently in stressed market conditions), which includes reverse liquidity stress testing to test the adequacy of its liquid resources and assess whether there are plausible scenarios that could cause a liquidity shortfall. The results of this quarterly review are presented to the ALCo and material findings are reported to the LCH.C Ltd ERCo. Any changes to the liquidity stress testing model are proposed by CaLRM and must be approved by the ALCo and LCH.C Ltd ERCo; material changes must also be notified to the LCH.C Ltd Risk Committee. The liquidity stress testing model is subject to validation by an independent model validation team each year. The results of the most recent validation were presented to the LCH.C Ltd Risk Committee in April 2015. Although the review found nothing to suggest that the liquidity risk models were unsatisfactory, a small number of recommendations were made that will be implemented by end-2015.

In its 2013/14 Assessment, the Bank set a regulatory priority for LCH.C Ltd to demonstrate that its approach of using the total initial margin requirements of the two largest clearing participants and

their affiliates to model its cover two variation margin outflows captured its variation margin requirements in a sufficient range of extreme but plausible scenarios.

LCH.C Ltd considers that its modelled variation margin outflows are in the extreme but plausible range due to the following:

- initial margin requirements are summed across LCH.C Ltd's services with no offset, ignoring the settlement netting in fully fungible variation margin flows that would be likely to occur in practice.
- the 'total' margin requirement used here includes add-ons for sovereign, concentration and wrong-way risks, thereby in practice exceeding the 99.7 per cent coverage that is captured by the initial margin requirement alone.

In addition, LCH.C Ltd conducts reverse stress tests to determine scenarios under which LCH.C Ltd's liquidity resources would be exhausted, and has processes in place to assess the plausibility of such scenarios.

The Bank reviewed LCH.C Ltd's liquidity reverse stress-testing results received during the Assessment period. These results indicate that the CCP has access to a significant amount of liquidity in excess of its expected needs, even in extreme but plausible scenarios. For each quarter, LCH.C Ltd concluded that it would be implausible for a liquidity deficit to be generated as a result of increases in variation margin outflows. The Bank has taken comfort from these results that LCH.C Ltd's approach to estimating its variation margin outflows in extreme but plausible conditions delivers appropriate outcomes.

The Bank also noted its 2013/14 Assessment that LCH.C Ltd was intending to examine the methodology it uses in its liquidity stress-testing model to allocate variation margin outflows (i.e. total initial margin) evenly across the three material currencies (EUR, GBP and USD). LCH.C Ltd's analysis demonstrates that even if 100 per cent of variation margin outflows were allocated to a single material currency, the liquidity coverage ratio for that currency would not be breached. That is, the methodology for allocating variation margin across the currencies has very little impact on the assessment of the adequacy of LCH.C Ltd's liquid resources.

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. 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 in the event that business as usual tools were insufficient to meet the liquidity shortfall.

LCH.C Ltd has a range of tools routinely available to manage its day-to-day liquidity needs, 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 CSDs or ICSDs.

LCH.C Ltd also has access to a number of other tools, set out in its Rulebook and Procedures, which 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 Recovery Plan also describes the steps that LCH.C Ltd would take to maintain the continuity of the services it provides in the event that it suffered extreme losses in the event of a participant default. If a loss from a participant default exceeded the size of prefunded resources, LCH.C Ltd would have powers to address that liquidity shortfall by: calling non-defaulting participants for Unfunded Contributions; invoking the Loss Distribution Process (VMGH); requesting non-defaulting participants for voluntary payments; and by closing all outstanding SwapClear contracts and close the service (see CCP Standard 4.8).

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.

Standard 8: Settlement finality

A central counterparty should ensure clear and certain final settlement, at a minimum by the end of the value date. Where necessary or preferable, a central counterparty should facilitate final settlement intraday or in real time.

LCH.C Ltd's settlements with respect to the SwapClear service involve cash payments for margin requirements and cash-settled derivatives contracts, and the transfer of non-cash collateral for initial margin requirements. LCH.C Ltd's Rulebook specifies the conditions under which the discharge of a payment, transfer instruction or other obligations by the CCP or its participants becomes final and irrevocable (CCP Standard 8.1). In addition, LCH.C Ltd's Rulebook defines the point after which accepted but unsettled payments are irrevocable (CCP Standard 8.3). Final settlement of obligations occurs on the value date, with margin called intraday where appropriate (CCP Standard 8.2).

8.1 A central counterparty's rules and procedures should clearly define the point at which settlement is final.

The Settlement Finality Regulations contained within the LCH.C Ltd Rulebook set out the conditions under which the settlement of obligations in respect of registered exchange-traded contracts and OTC contracts are final and irrevocable (see CCP Standard 1.5). These Regulations are supported by LCH.C Ltd's designation under the UK *Financial Markets and Insolvency (Settlement Finality) Regulations 1999*, which implement *Directive 98/26/EC of the European Parliament and of the Council of 19 May 1998 on settlement finality in payment and securities settlement systems* (the Settlement Finality Directive). The Settlement Finality Directive seeks to provide certain protections for payment and settlement systems by minimising the disruption caused by insolvency proceedings brought against a participant in such a system.

LCH.C Ltd's settlements with respect to the SwapClear service involve cash payments for margin requirements and cash-settled derivatives contracts, and the transfer of non-cash collateral for initial margin requirements.⁶³ LCH.C Ltd instructs cash payments to and from participants via 'Payment Transfer Orders', sent to the relevant participant's settlement bank in LCH.C Ltd's PPS (i.e. the participant's PPS bank; see CCP Standard 9 for more details on the PPS), generally via SWIFT.⁶⁴ Under LCH.C Ltd's Settlement Finality Regulations, a Payment Transfer Order executed through the PPS becomes irrevocable when confirmation is sent by the relevant PPS bank to LCH.C Ltd that the payment will be met. The LCH.C Ltd Procedures specify that a participant's obligation to LCH.C Ltd will be deemed met only when funds have been transferred from the PPS bank to LCH.C Ltd's concentration bank, and any time permitted by the relevant payment system for the recall of any such payment has expired. The Procedures specify that LCH.C Ltd's obligation to a participant will be deemed met when funds have been transferred from LCH.C Ltd's concentration bank to the participant's PPS bank.

LCH.C Ltd instructs the transfer of title to or interest in securities via 'Securities Transfer Orders', sent to a Securities System Operator (i.e. a CSD or securities settlement facility (SSF)) via the CMS. (For the SwapClear service, transfer of securities is relevant for the purpose of collateralisation. As discussed in CCP Standard 1.2, LCH.C Ltd's rights over non-cash collateral are on a 'security interest' basis, which is governed by Charge Agreements between LCH.C Ltd and each clearing participant.) Under LCH.C Ltd's Settlement Finality Regulations, a Securities Transfer Order becomes irrevocable at the time after which the Securities System Operator prescribes such instruction may not be revoked by a participant or other person.

LCH.C Ltd seeks legal opinions regarding the enforceability of the LCH.C Ltd Rulebook in all jurisdictions in which its members are incorporated. The Rulebook aims to provide a high degree of legal certainty with regard to settlement finality, among other things (CCP Standard 1.5).

8.2 A central counterparty should ensure final settlement no later than the end of the value date, and preferably intraday or in real time, to reduce settlement risk.

For each revaluation of participants' obligations where a net call is made on a participant, the participant's PPS bank is required to make an irrevocable commitment to fund the obligation due to LCH.C Ltd. This commitment is due by 9.00 am UK time if the call was made overnight, or within one hour if the call was made intraday. Calls made in GBP, EUR, USD or CAD are processed with same day value, and must be credited to LCH.C Ltd's nominated account by the close of business. Where the obligation is denominated in another currency, the call is made with a value date of the following day.

63 All derivative contracts cleared through SwapClear are cash-settled. Variation margin and default fund contributions are also required in cash.

64 Fax or email confirmation would be used in a contingency scenario where SWIFT was unavailable.

In this case, the PPS bank must make an irrevocable commitment on the same timeframe as for other currencies, but due to payment system cut-off times actual payment is not made until the following day (next business day value).

Concentration payments from the PPS bank to LCH.C Ltd's account at the relevant concentration bank must be completed within two hours of receipt of the concentration instruction. Concentration instructions for GBP, EUR and USD are sent regularly throughout the day; instructions for JPY and CAD are sent by 9.00 am UK time; and instructions for other currencies are sent at 7.30 am UK time. Where the net obligation is in favour of participants at a PPS bank, payment occurs from the concentration bank to that PPS bank according to the same two-hour timeline as outlined above.

LCH.C Ltd has announced that in the first half of 2016 it intends to introduce, for same-day currencies (i.e. GBP, EUR, USD or CAD), the option of calling an alternative major same-day currency (USD, GBP or EUR), for both initial and variation margin, when there is a banking holiday in the currency in which the obligation has arisen. Due to investment limitations in EUR, LCH.C Ltd's preferred alternative currency would likely be USD, then GBP and then EUR.

LCH.C Ltd permits clearing participants to meet intraday margin calls on client accounts by lodging additional non-cash collateral. Transfers of securities to satisfy intraday margin calls on client accounts must be settled on the value date for the margin call. LCH.C Ltd requires that the transfer of non-cash collateral be completed within one hour of the participant's notification of its intention to transfer such collateral.

Final settlement of derivatives cleared through SwapClear occurs via the PPS according to the same timelines for variation margin set out above.

8.3 A central counterparty should clearly define the point after which unsettled payments, transfer instructions or other obligations may not be revoked by a participant.

As described under CCP Standard 8.1, Payment Transfer Orders through the PPS are irrevocable under LCH.C Ltd's Settlement Finality Regulations once the PPS bank has confirmed the commitment via SWIFT message. Securities Transfer Orders sent to a Securities System Operator are irrevocable under LCH.C Ltd's Settlement Finality Regulations at the time after which the Securities System Operator prescribes such instructions may not be revoked by a participant or other person.

Standard 9: Money settlements

A central counterparty should conduct its money settlements in central bank money where practical and available. If central bank money is not used, a central counterparty should minimise and strictly control the credit and liquidity risk arising from the use of commercial bank money.

LCH.C Ltd uses its PPS to settle cash payment obligations with its clearing participants. LCH.C Ltd uses a combination of commercial bank money and central bank money to conduct its money settlements (CCP Standard 9.1).

LCH.C Ltd sets risk-based criteria for banks participating in its PPS in order to manage and limit credit and liquidity risks arising from the use of commercial settlement banks (CCP Standards 9.2, 9.3). LCH.C Ltd does not conduct money settlement on its own books (CCP Standard 9.4). LCH.C Ltd's PPS Agreements clearly state when payments are final and provide for intraday money settlements (CCP Standard 9.5).

During the Assessment period, LCH.C Ltd began using its ESA at the Bank to effect the settlement of its AUD obligations. In its 2013/14 Assessment, the Bank specified that LCH.C Ltd should develop and implement arrangements for the settlement of AUD obligations through its ESA. LCH.C Ltd began using its ESA to effect its AUD concentration payments (i.e. settlement of AUD obligations between LCH.C Ltd and its PPS banks) in late March 2015. LCH.C Ltd is currently in the process of completing the implementation of an Australian PPS similar to the model currently operated in the UK and US. The Bank has set a regulatory priority for the 2015/16 Assessment period that LCH.C Ltd should complete its implementation of PPS arrangements in Australia.

9.1 A central counterparty should conduct its money settlements in central bank money, where practical and available, to avoid credit and liquidity risks. A central counterparty that the Reserve Bank determines to be systemically important in Australia and has Australian dollar obligations should settle its Australian dollar obligations across an Exchange Settlement Account held at the Reserve Bank, in its own name or that of a related body corporate acceptable to the Bank.

Settlement arrangements for SwapClear involve arrangements to settle obligations between LCH.C Ltd and its participants, including for initial margin, variation margin and cash settlement of contracts, default fund contributions and participation fees. Variation margin and settlement net to zero across all participants. By contrast, initial margin, default fund contributions and participation fees result in a net increase or net decrease in funds held by the CCP.

Cash payments to and from SwapClear participants are settled through the PPS. The PPS is regulated and overseen by the BoE as a 'recognised payment system' under the UK *Banking Act 2009*. The PPS provides for settlement of margins and other payments between LCH.C Ltd and each clearing participant. LCH.C Ltd calls funds from, or pays funds to, clearing participants across the books of PPS banks (commercial settlement banks) acting on behalf of those participants. PPS banks then make (or receive) payments to (or from) the LCH.C Ltd 'concentration bank' via the relevant Real Time Gross Settlement system for each currency (using a correspondent bank if they do not have a local presence). Any payments to or from the concentration bank represent the net position against LCH.C Ltd of all of the participants that use a given PPS bank.⁶⁵

LCH.C Ltd operates a UK and a US PPS (see CCP Standard 9.5); 11 banks currently participate in the UK PPS, while six banks currently participate in the US PPS. In its statement of risk appetite, as set out in the Group Risk Governance Framework, the LCH.C Group Board specifies that it expects the Group CCPs to use central banks for payments and cash settlements where possible. LCH.C Ltd uses the BoE as its concentration bank for GBP and EUR; the Bank of Canada for CAD; the Swiss National Bank for CHF; and the Bank for AUD. LCH.C Ltd uses commercial concentration banks for all other currencies: Citibank and BNY Mellon for USD (LCH.C Ltd does not have access to the US Federal Reserve); and HSBC for the remaining currencies.⁶⁶

Upon the licensing of the SwapClear service in Australia, the Bank set a regulatory priority that LCH.C Ltd should open an ESA. In its 2013/14 Assessment, the Bank further specified that LCH.C Ltd should develop and implement arrangements for the settlement of AUD obligations through its ESA. LCH.C Ltd was granted an ESA in late 2014, and began using its ESA to effect its AUD concentration

65 For example, consider a PPS bank that acts on behalf of just two participants. If one participant is owed \$1 from LCH.C Ltd, and the other participant owes \$1 to LCH.C Ltd, there will be no payment from the PPS bank to the concentration bank.

66 Citibank is the concentration bank for USD when the PPS is operating in the United Kingdom. BNY Mellon is the concentration bank for USD when the PPS is operating in the United States.

payments (i.e. settlement of AUD obligations between LCH.C Ltd and its PPS banks) in late March 2015.

LCH.C Ltd is in the process of establishing an Australian PPS similar to the model currently operated in the UK and US (see CCP Standard 6.8). 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 AUD obligations across its ESA (i.e. to 'self-PPS'). This will ensure that settlement of those participants' AUD obligations does not involve unnecessary tiering, complexity or reliance on third-party commercial settlement banks. The Bank has set a regulatory priority for the 2015/16 Assessment period that LCH.C Ltd should complete its implementation of PPS arrangements in Australia.

9.2 If central bank money is not used, a central counterparty should conduct its money settlements using a settlement asset with little or no credit or liquidity risk.

The PPS involves transitional settlement across the books of the commercial banks that act as PPS banks. See CCP Standard 9.3 for a description of the risk management practices applied by LCH.C Ltd in respect of its PPS arrangements.

9.3 If a central counterparty settles in commercial bank money or its participants effect settlements using commercial settlement banks, it should monitor, manage and limit credit and liquidity risks arising from the commercial bank money settlement agents and commercial settlement banks. In particular, a central counterparty should establish and monitor adherence to strict criteria for commercial banks appropriate to their role in the settlement process, taking account of matters such as their regulation and supervision, creditworthiness, capitalisation, access to liquidity and operational reliability. A central counterparty should also monitor and manage the concentration of its and its participants' credit and liquidity exposures to commercial bank money settlement agents and settlement banks.

The rules governing the PPS ensure that LCH.C Ltd does not have a credit exposure to PPS banks. A clearing participant's obligation to LCH.C Ltd will only be deemed met once funds have been transferred from the PPS bank to LCH.C Ltd's concentration bank and any time permitted by the relevant payment system for the recall of any such payment has expired (see CCP Standard 8.1). A participant remains responsible for the obligation in the event of the PPS bank's failure. LCH.C Ltd does have a credit exposure to its concentration banks, which begins once funds are received by the concentration bank from a PPS bank, and continues until the funds are transferred by the concentration bank to another entity to complete an LCH.C Ltd treasury investment.

LCH.C Ltd requires that all commercial banks participating in the PPS must maintain status as a bank under the supervision of banking authorities in relevant jurisdictions. To manage credit and liquidity exposures, LCH.C Ltd sets risk-based criteria for PPS banks, as outlined in the LCH.C Group Settlement, Payment and Custody Risk Policy. These criteria include:

- a requirement that the bank maintain an ICS below a predefined threshold⁶⁷
- operational requirements around accounting and SWIFT messaging
- a requirement to adhere to LCH.C Ltd procedures.

67 ICS are set using the same methodology as for clearing participants (see CCP Standard 4).

LCH.C Ltd reserves the right to apply more stringent criteria when, in its assessment, a PPS bank's financial resources or operational capability are not commensurate with its level of business. In the event that a PPS bank's ICS rises above the predefined threshold or it fails to meet the required operational capability criteria, LCH.C Ltd may deem that the bank is no longer eligible to operate as a PPS bank. LCH.C Ltd envisages that any exit process will take no longer than three months, and will ultimately depend on how quickly affected participants can establish arrangements with another PPS bank. In the event that a bank no longer wishes to participate in the PPS, a minimum of 90 days' notice must be given and arrangements made with LCH.C Ltd for an orderly exit. To deal with an unexpected and immediate exit of a PPS bank (e.g. due to insolvency), all participants are required to have contingency plans such that they can continue to meet obligations to LCH.C Ltd on an ongoing basis. These arrangements are recorded in LCH.C Ltd's Onboarding department, and would be temporary until replacement PPS arrangements were established.

As discussed under CCP Standard 9.1, LCH.C Ltd's preference is to use central banks as concentration banks. Commercial concentration banks are required to meet the above criteria for PPS banks, as well as the following:

- a more stringent ICS threshold
- specified intraday and overnight unsecured exposure limits – intraday unsecured exposures to commercial concentration banks are subject to limits based on LCH.C Ltd's capital (this includes exposures related to both investment and concentration activity), while overnight unsecured exposures are subject to fixed limits
- more stringent monitoring and escalation of intraday limit breaches.

LCH.C Ltd also maintains contingency options for its commercial concentration banks, in accordance with the LCH.C Group Payment, Settlement and Custody Risk Policy.

New PPS and concentration banks must be approved by the LCH.C Ltd ERCo, upon request from CaLM, Clearing Services or the Operations department. The Operations department is responsible for conducting initial and ongoing due diligence of PPS and concentration banks, as well as quarterly monitoring of operational performance. The LCH.C Ltd ERCo is notified of the results of this ongoing monitoring. Operational and legal due diligence is performed both prior to, and at least every two years following, acceptance of a new PPS bank, and involves Legal department review. The due diligence process aims to provide certainty that the assets belonging to LCH.C Ltd and its participants are fully segregated and identifiable, and would be promptly accessible in the event the PPS bank, concentration bank or participant defaulted. LCH.C Ltd also monitors its intraday exposures to commercial concentration banks via reports generated every 15 minutes.

LCH.C Ltd does not impose concentration limits on the volume of payment activity that flows through individual PPS banks. Participants choose their own PPS banks and remain liable for meeting obligations due to LCH.C Ltd until funds have been transferred to LCH.C Ltd's concentration bank. They must maintain contingency arrangements for meeting obligations to LCH.C Ltd in the event that a PPS bank failed or experienced an operational disruption. During the Assessment period, LCH.C Ltd tested clearing participants' PPS contingency arrangements; multiple clearing participants' contingency arrangements were tested simultaneously to ensure such arrangements are robust to widespread unavailability of the PPS. This testing will be repeated on an annual basis. Participants' credit exposures to individual PPS banks are limited by the deadlines for concentration payments stated in the PPS Agreements (CCP Standard 9.5).

9.4 If a central counterparty conducts money settlements on its own books, it should minimise and strictly control its credit and liquidity risks.

LCH.C Ltd does not conduct money settlement on its own books.

9.5 A central counterparty's legal agreements with any commercial bank money settlement agents should state clearly when transfers on the books of the relevant commercial bank are expected to occur, that transfers are to be final when effected, and that funds received should be transferable as soon as possible, at a minimum by the end of the day and ideally intraday, in order to enable the central counterparty and its participants to manage credit and liquidity risks.

LCH.C Ltd executes a standardised set of binding terms and conditions (i.e. a 'PPS Agreement') with the commercial banks that participate in the PPS.⁶⁸ The PPS Agreement requires PPS banks to confirm PPS calls made to participants for which they provide PPS services; calls made overnight UK time must be confirmed by 9.00 am UK time the following morning, and intraday calls must be confirmed within one hour of the call being received by the PPS bank (CCP Standard 8.2). Transfers must then be credited to LCH.C Ltd's nominated account 'without delay', and by the latest at the close of business on the value date. PPS banks must make concentration payments (i.e. transfers to the relevant concentration bank) within two hours of receipt of instructions from LCH.C Ltd (see CCP Standard 8 for further detail, including on finality of settlements). The BoE's concentration bank role is governed solely by a specific agreement executed by the BoE and LCH.C Ltd. Similarly, a specific agreement on concentration activities was executed with BNY Mellon as an addendum to the PPS Agreement already in place. LCH.C Ltd considers that the standard PPS Agreement remains sufficient to govern the concentration activities of Citibank and HSBC.

As noted under CCP Standard 9.3, LCH.C Ltd does not have a credit exposure to PPS banks. Participants' credit exposures to individual UK PPS banks are limited by a requirement in the terms and conditions that all PPS transfers onwards to the concentration bank should be made within two hours of the transfer request being made by LCH.C Ltd (see CCP Standard 8.2). US PPS banks must perform the concentration process if requested by LCH.C Ltd and must do so before the US close of business.

Standard 10: Physical deliveries

A central counterparty should clearly state its obligations with respect to the delivery of physical instruments or commodities and should identify, monitor and manage the risks associated with such physical deliveries.

LCH.C Ltd's SwapClear service does not offer any contracts that can be physically delivered.

The Bank has concluded that CCP Standard 10 does not apply to LCH.C Ltd's SwapClear service.

10.1 A central counterparty's rules should clearly state its obligations with respect to the delivery of physical instruments or commodities.

Not applicable to LCH.C Ltd's SwapClear service.

⁶⁸ Different agreements exist depending on whether the bank participates in the PPS in the UK or the US. A specific agreement for the Australian PPS is also being developed.

10.2 A central counterparty should identify, monitor and manage the risks and costs associated with the storage and delivery of physical instruments or commodities.

Not applicable to LCH.C Ltd's SwapClear service.

Standard 11: Exchange-of-value settlements

If a central counterparty is involved in the settlement of transactions that comprise two linked obligations (for example, securities or foreign exchange transactions), it should eliminate principal risk by ensuring that the final settlement of one obligation is conditional upon the final settlement of the other.

LCH.C Ltd's SwapClear service does not involve exchange-of-value settlements.

The Bank has concluded that CCP Standard 11 does not apply to LCH.C Ltd's SwapClear service.

11.1 A central counterparty should eliminate principal risk associated with the settlement of any obligations involving two linked obligations by ensuring that the payment system or securities settlement facility employed operates in such a way that the final settlement of one obligation occurs if and only if the final settlement of the linked obligation also occurs, regardless of whether the securities settlement facility settles on a gross or net basis and when finality occurs.

Not applicable to LCH.C Ltd's SwapClear service.

11.2 A central counterparty should eliminate principal risk associated with the settlement of linked obligations by ensuring that it employs an appropriate delivery versus payment (DvP), delivery versus delivery (DvD) or payment versus payment (PvP) settlement mechanism.

Not applicable to LCH.C Ltd's SwapClear service.

Standard 12: Participant default rules and procedures

A central counterparty should have effective and clearly defined rules and procedures to manage a participant default. These rules and procedures should be designed to ensure that the central counterparty can take timely action to contain losses and liquidity pressures and continue to meet its obligations.

LCH.C Ltd has powers to manage a clearing participant default under its Rulebook, and has internal documentation setting out the SwapClear DMP (CCP Standard 12.1). The LCH.C Ltd default rules give LCH.C Ltd the right to undertake a number of actions in respect of a defaulter, including: hedging the market risk on the defaulter's contracts; transferring contracts to other participants; and terminating contracts (CCP Standards 12.1, 12.2). LCH.C Ltd allocates losses to clearing participants in a way that is intended to provide participants with incentives to bid competitively in the auction of the defaulter's positions (CCP Standard 12.1). LCH.C Ltd has published its Rulebook and a high-level overview of the SwapClear DMP on its website (CCP Standard 12.3). Default management procedures are tested and reviewed on at least an annual basis. Clearing participants are required to participate in these tests (CCP Standard 12.4). LCH.C Ltd's default management procedures are designed to take into account potential impacts on relevant jurisdictions and markets (CCP Standard 12.5).

12.1 A central counterparty should have default rules and procedures that enable the central counterparty to continue to meet its obligations in the event of a participant default and that address the replenishment of resources following a default. A central counterparty should ensure that financial and other obligations created for non-defaulting participants in the event of a participant default are proportional to the scale and nature of individual participants' activities.

Rules and procedures

The LCH.C Ltd Rulebook sets out the contractual rights and obligations of LCH.C Ltd and its clearing participants (see CCP Standard 1). The management of the default of a SwapClear clearing participant would be governed by two main parts of the Rulebook:

- the LCH.C Ltd default rules contain general default rules, which set out rights and related obligations that apply to the default of a participant in any of LCH.C Ltd's services, and a 'SwapClear Default Management Process Annex', which sets out rights and obligations specific to a SwapClear clearing participant default
- the LCH.C Ltd Procedures describe, among other things, the requirement to participate in the DMP and fire drills, and the possibility of relying on affiliated participants or approved outsourcing agents to meet that requirement.

In addition to the LCH.C Ltd Rulebook, SwapClear's DMP is described in multiple tiers of internal policies:

- The Group Default Management Policy (owned by Group Risk) details the standards that must be met in each CCP across the Group in dealing with the default of a clearing participant. It is reviewed annually by the LCH.C Ltd ERCo and the LCH.C Ltd Risk Committee, and is also approved by the LCH.C Ltd Board annually.
- The LCH.C Ltd Default Management Guidelines (owned by the LCH.C Ltd Risk Management department) implement the DMP according to the Group Default Management Policy, and outline the key roles and responsibilities in managing the default of a SwapClear clearing participant. The guidelines are reviewed by the LCH.C Ltd ERCo when there are material changes.
- SwapClear's default management procedures (owned by SwapClear) describe the details of SwapClear's DMP and follow the principles outlined in the Group Default Management Policy and the LCH.C Ltd Default Management Guidelines. They are subject to frequent reviews to reflect changes in the service and industry best practice.

Default management

In the event of a participant default, the SwapClear DMG would be responsible for the day-to-day management of the default process as it relates to SwapClear. The SwapClear DMG includes the SwapClear Head of Business Risk, who would generally act as chair during a default, other SwapClear department heads and a revolving group of senior traders that would be seconded to LCH.C Ltd from participants in the event of a default.⁶⁹ The LCH.C Ltd DCMT, which consists of the LCH.C Ltd CEO, CRO

⁶⁹ It is a SwapClear participation requirement that participants make available (on a rotational basis) representatives, with requisite skills or experience acceptable to LCH.C Ltd, as members of the SwapClear DMG. As a result of its acceptance of inflation rate derivatives for clearing, LCH.C Ltd expanded the membership of the SwapClear DMG during the Assessment period to include three inflation rate derivative specialists. Members of the DMG must treat any information they receive as confidential to LCH.C Ltd, are not permitted to contact their employer during the hedging process, and must not join another CCP's DMG.

and various other LCH.C Ltd executives, would be responsible for the overall management of the default in LCH.C Ltd. The DCMT would coordinate the DMGs for LCH.C Ltd's different services. The LCH.C Ltd CEO is responsible for convening the LCH.C Ltd DCMT in the event of a participant default in one of LCH.C Ltd's services. LCH.C Group and each LCH.C Group CCP also has a DCMT; the LCH.C Group DCMT would meet to consider coordination across CCPs if required.

The SwapClear DMP can be viewed as comprising five stages, some of which run concurrently. If multiple clearing participants defaulted simultaneously, LCH.C Ltd would manage, hedge and auction each defaulting participant's portfolio separately, though it may seek operational efficiencies where appropriate.

1. Declaration of default and immediate actions

A clearing participant default can be triggered either by LCH.C Ltd declaring the participant to be in default or the occurrence of an 'automatic early termination event' (see CCP Standard 12.2). LCH.C Ltd would undertake the following actions after a default, mostly in parallel:

- the LCH.C Group marketing and communications function would publish a default notice and execute its pre-agreed market communication strategy
- the ability of the defaulting participant to submit trades would be revoked (this would also prevent clients from submitting trades through the defaulting participant)
- the Chairman of the SwapClear DMG would organise a meeting within one hour of the declaration of default and the SwapClear DMG would be given access to risk-related information
- CaLM may convert some or all of the non-cash collateral held on behalf of the defaulting participant and its clients into cash.

2. Porting of client accounts

LCH.C Ltd would seek to port the positions and collateral of a defaulting clearing participant's client(s) during the client's 'porting window' (see also CCP Standard 13). Following a participant default, LCH.C Ltd would choose a porting window for each type of client account, which would be a period of at least 24 hours commencing on the day of the default.⁷⁰ A client that had not nominated backup clearing participants in advance would be given the opportunity to seek an alternative clearing participant. SwapClear would provide each client's backup clearing participant(s) with a report on the client's positions, margin and collateral. The backup clearing participant would then decide whether to accept the client, and LCH.C Ltd would port those clients that had a backup clearing participant willing to accept them. LCH.C Ltd would combine the portfolios of any clients that did not port, and the combined portfolio would be hedged and auctioned separately from the defaulter's house portfolio.

3. Hedging and portfolio splitting

The SwapClear DMG would plan and execute a set of hedge trades to reduce the market risk on the portfolio of the defaulting clearing participant and the combined portfolio of non-porting clients. The hedge trades must be SwapClear-eligible products, and the counterparties must be non-defaulting clearing participants of SwapClear. In the process of hedging the defaulted portfolio, the SwapClear

⁷⁰ LCH.C Ltd would have the discretion to increase or decrease the porting window for individual clients. The LCH.C Ltd default rules specify circumstances under which LCH.C Ltd could reduce an individual client's porting window below 24 hours (though not below 12 hours).

DMG may split a particular currency portfolio into smaller sub-portfolios if it determined that doing so would lead to a more efficient auction process.⁷¹

4. Portfolio auctions

LCH.C Ltd would auction the defaulting clearing participant's house portfolio, and if applicable, the non-porting client portfolio. Each currency portfolio would be auctioned separately in an order determined by the DMG. Participants would be required to submit bids in an auction on any currency they cleared. The winner of the auction would be the participant that submitted the highest bid; or if multiple participants submitted an equal highest bid, the first participant to submit the equal highest bid.⁷² In the event that the auction gave rise to auction losses, these would be allocated to the default waterfall. LCH.C Ltd's rules allocate losses to clearing participants' prefunded and unfunded default fund contributions in an order that is intended to provide participants with incentives to bid competitively in the auction (see 'use and sequencing of financial resources' below). If the auction loss on a currency portfolio was smaller than the prefunded resources attributed to that currency, that auction would proceed to portfolio transfer and settlement. If the auction loss exceeded prefunded resources attributed to that currency, the DMG would have the discretion to re-auction the currency portfolio.

5. Portfolio transfer and settlement

Each currency portfolio would be transferred at the close of business on the day on which it was successfully auctioned. The associated bid amounts and margin payments would be settled between the winner and SwapClear through the PPS by the next morning. The winner of a currency portfolio would be responsible for the risk on that currency portfolio as soon as SwapClear determined the winner, even though the portfolio transfer would not occur until the close of business on the day of the auction. Hence, in the start-of-day margin run the next morning, the auction winner would pay or receive variation margin to reflect any changes in the net present value of the portfolio from when SwapClear determined the winner.⁷³

Use and sequencing of financial resources

In the event of a clearing participant default, LCH.C Ltd would allocate any losses it incurred during the DMP to the default waterfall. LCH.C Ltd would allocate losses using AIPs, which are intended to provide incentives to participants to bid competitively in the auction. The process of calculating the allocation of losses would occur in parallel to the steps described above, and would not be completed until after all auctions had occurred.

Before the first auction, LCH.C Ltd would allocate all pre-auction losses to the default waterfall, as follows:

71 If a currency portfolio was split, it is expected that it would be split into one or more portfolios with very low market risk (delta neutral or near neutral), and one 'residual portfolio' comprising the other trades that could not be allocated to the delta neutral portfolios. The residual portfolio would be auctioned together with any hedges in that currency entered into by the DMG, so that the portfolio being auctioned was nearly risk-neutral.

72 Under section 2C of the LCH.C Ltd Procedures, LCH.C Ltd would have the discretion to reject bids if it considered that accepting the bid may: breach a legal or regulatory requirement; cause legal action to be taken against LCH.C Ltd; endanger LCH.C Ltd, its participants or any of the markets in which it operates; or cause LCH.C Ltd or its participants reputational harm.

73 Any coupons, price alignment interest and fees sent for settlement on or before the end of the day on which a portfolio was auctioned would be the responsibility of the defaulting participant, and would be allocated to the default waterfall. The winner would only become responsible for making these payments on the day after the portfolio was auctioned.

- first, to the defaulter’s collateral and CCP capital allocated to the default fund
- second, to the prefunded default fund contribution, on a pro-rata basis
- third, to unfunded default fund contributions.⁷⁴

At commencement of the auction phase, the remaining assets in the default waterfall would be attributed to AIPs. Each surviving clearing participant’s default fund contribution would be divided into currency-specific AIPs in proportion to the surviving participant’s market risk in each currency.⁷⁵ For example, a participant with a mostly AUD-denominated portfolio would have most of its default fund contribution attributed to an AUD AIP. Each participant’s obligation to post assessments would be split across currency-specific AIPs in the same way, even if LCH.C Ltd considered it unlikely that assessments would need to be called. SwapClear would inform each participant about how its resources were split across AIPs.

After all the auctions were completed, LCH.C Ltd would calculate the auction loss allocated to each AIP.⁷⁶ The auction losses would be allocated in a way that would incentivise participants to bid competitively in currencies in which they had substantial market risk. The auction loss from each currency auction would be allocated as follows:

- first, to the defaulter’s collateral and CCP capital allocated to the default fund
- second, to the prefunded default fund contribution AIPs attributed to that currency portfolio; the AIPs of participants that did not bid or that submitted uncompetitive bids would be used first
- third, to prefunded default fund AIPs attributed to other currency portfolios
- fourth, to unfunded default fund AIPs attributed to that currency portfolio; the AIPs of participants that did not bid or that submitted uncompetitive bids would be used first
- fifth, to unfunded default fund AIPs attributed to other currency portfolios.

Although the final allocation of losses would not be calculated until all auctions were complete, LCH.C Ltd would monitor pre-auction losses and auction losses on a daily basis throughout the DMP. If the pre-auction loss or the auction loss used 25 per cent or more of prefunded default fund contributions at any time in the DMP, then LCH.C Ltd may call Unfunded Contributions (Assessments) from clearing participants. If, at any time in the DMP, pre-auction losses or auction losses consumed all Unfunded Contributions, LCH.C Ltd would attempt to allocate the remaining losses with VMGH (CCP Standard 4.8).

As discussed under CCP Standard 4.8, SwapClear has rules and procedures to replenish the default fund following completion of the DMP. 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 DMP was completed, SwapClear would call non-defaulting clearing participants for contributions in order to bring the SwapClear default fund up to no less than the SwapClear Fund Floor. The default

74 Pre-auction loss is defined as the net loss that SwapClear incurred due to variation margin, fees, coupons and price alignment interest, calculated as at the last end-of-day margin run before the first auction.

75 A defaulter’s inflation rate derivatives portfolio will be auctioned separately to a defaulter’s interest rate derivatives portfolio; both portfolio types would be split into currency-specific portfolios prior to auction. Losses on either portfolio type would be allocated in the same manner (i.e. through the use of AIPs).

76 Auction loss is defined as the net present value of a portfolio at the last end-of-day margin run before the first auction minus the amount the portfolio sold for in the auction.

fund size would be recalculated using the usual method based on stress tests on the first day that is both 30 days after the most recent participant default and is the first business day of a month.

12.2 A central counterparty should be well prepared to implement its default rules and procedures, including any appropriate discretionary procedures provided for in its rules. This requires that the central counterparty should:

- (a) require its participants to inform it immediately if they:**
 - (i) become subject to, or aware of the likelihood of external administration, or have reasonable grounds for suspecting that they will become subject to external administration; or**
 - (ii) have breached, or are likely to breach, a risk control requirement of the central counterparty; and**
- (b) have the ability to close out, hedge or transfer, a participant's open contacts in order to appropriately control risk of a participant that:**
 - (i) becomes subject to external administration; or**
 - (ii) breaches a risk-control requirement of the central counterparty.**

LCH.C Ltd's Clearing Membership Agreement (see CCP Standard 1) establishes legally binding notification requirements that SwapClear clearing participants must meet in relation to specified events. In particular, a SwapClear participant must immediately notify LCH.C Ltd when: it becomes aware of a petition for bankruptcy or administration order; it ceases, or believes it may cease, to meet the criteria for admission; or there has been a change in its business that would affect the participant's ability to perform its obligations under the LCH.C Ltd Rulebook.

A clearing participant is in default if:

- LCH.C Ltd has declared the participant to be in default. LCH.C Ltd can declare a participant in default if the participant appears to be unable, or appears likely to become unable, to meet its obligations to LCH.C Ltd. The authority to declare a participant in default lies with the LCH.C Ltd CEO.
- An automatic early termination event has occurred. LCH.C Ltd has powers in its default rules to specify certain events as automatic early termination events, although to date it has not exercised these powers.

The LCH.C Ltd default rules give LCH.C Ltd the right to undertake a number of actions in respect of a defaulting clearing participant, including: hedging the market risk on the defaulter's contracts; transferring contracts to other participants; and terminating contracts. Protections under the UK *Companies Act 1989* and the UK *Financial Markets and Insolvency (Settlement Finality) Regulations 1999 (as amended)* seek to give priority to LCH.C Ltd's default arrangements over insolvency proceedings (see CCP Standard 1.5).

The LCH.C Ltd Rulebook provides LCH.C Ltd with discretion regarding aspects of the DMP. For example, LCH.C Ltd would have some discretion on the length of porting windows, on whether to split currency portfolios and on the order in which to auction currency portfolios (see CCP Standard 12.1 for more details about LCH.C Ltd's discretion with respect to porting windows). The LCH.C Ltd CEO would have the authority to make any final decisions regarding porting, hedging or the auction (although this authority could be delegated to others, such as to the SwapClear DMG). The LCH.C Ltd

CEO also has the authority to override the Group Default Management Policy if its application would lead to results not in line with the policy's intent. The preparedness of the LCH.C Ltd CEO and others to carry out these discretionary procedures is tested in regular fire drills (see CCP Standard 12.4).

12.3 A central counterparty should publicly disclose key aspects of its default rules and procedures.

The SwapClear DMP is governed by the LCH.C Ltd Rulebook, which is publicly available on LCH.C Ltd's website. The Rulebook sets out the rights and obligations of both LCH.C Ltd and SwapClear clearing participants in relation to a default (see CCP Standard 12.1). LCH.C Ltd notifies its participants of any amendments to the Rulebook. A high-level summary of the DMP is also published on the SwapClear website.

12.4 A central counterparty should involve its participants and other stakeholders in the testing and review of the central counterparty's default procedures, including any close out procedures. Such testing and review should be conducted at least annually and following material changes to the rules and procedures to ensure that they are practical and effective.

LCH.C Ltd conducts fire drills to test clearing participants' and the CCP's awareness of and ability to implement the DMP. The LCH.C Ltd Default Management Guidelines require that each year LCH.C Ltd participate in at least one Group-wide fire drill and conduct at least one partial fire drill. Group-wide fire drills test the default management framework across all of LCH.C Group's CCPs. Partial fire drills test the default management framework of LCH.C Ltd alone, or the framework of a particular service, such as SwapClear.⁷⁷ In either type of fire drill, the DMGs of the relevant services are convened. Group-wide fire drills also involve a variety of teams within LCH.C Group and LCH.C Ltd, such as Group Risk and Group Compliance. Partial fire drills may or may not involve these teams, depending on the purpose of the drill.

Fire drills must test:

- the coordination of the DMP from start to finish
- the capability to manage a default across multiple markets
- the production of reports on positions and risk, especially intraday reports
- the liquidation and hedging strategy
- any implementation of risk mitigants such as, but not limited to, stopping payments
- the ability to port client positions
- the ability to turn off a defaulted participant's access to trading systems immediately.

A post-event review document is sent to clearing participants after each fire drill, and LCH.C Ltd sometimes solicits feedback from participants through a questionnaire.

⁷⁷ Partial fire drills may also be run prior to the launch of a new product or material change. For example, prior to launching clearing of inflation rate derivatives, LCH.C Ltd required those clearing participants that wished to clear the product from launch to participate in such a fire drill. The drill tested the participants' ability to value and bid on, and the SwapClear DMG's ability to hedge, an inflation rate derivatives portfolio.

The LCH.C Ltd Procedures require that each SwapClear clearing participant be able to participate, or demonstrate that it has an affiliated clearing participant that can participate, in the SwapClear DMP. A prospective participant must pass a driving test as part of its pre-membership requirements to demonstrate its ability to participate in the DMP (see CCP Standard 17.2). The driving test assesses a clearing participant's ability to price and bid for a notional portfolio of trades within a specific currency and in a specified timeframe, and is intended to replicate the auction component of the DMP. Participants may be required to take part in further driving tests before clearing any additional currencies or new products. Each clearing participant is also required to participate in any SwapClear fire drill as required, or demonstrate that it has an affiliated clearing participant that can participate.

A clearing participant can meet both of these requirements by demonstrating that it has a legally binding agreement with an outsourcing agent that LCH.C Ltd has approved for the purpose of meeting the requirement. Participants that use this option are required to appoint at least three outsourcing agents. LCH.C Ltd may subject outsourcing agents to more rigorous driving tests and fire drills than clearing participants, and SwapClear may call additional collateral from participants that appoint outsourcing agents to reflect the additional time required to invoke an outsourcing process in the DMP.

The LCH.C Ltd Risk Committee reviews a summary of the preceding year's fire drills on an annual basis. Additionally, the LCH.C Ltd ERCo and the Group Audit Committee review a report on each Group-wide fire drill, and the LCH.C Ltd LMC reviews a summary of each Group-wide fire drill report.

12.5 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.

The Bank's 2013/14 Assessment recommended that LCH.C Ltd ensure that its crisis management arrangements take appropriate account of Australian stability interests. In particular, the Bank has sought to understand how LCH.C Ltd would manage the default of an Australian-based clearing participant, or any participant with a large AUD-denominated portfolio.

LCH.C Ltd has informed the Bank that the SwapClear DMP has been designed to allow sufficient flexibility to manage a defaulting clearing participant's positions in any currency, including AUD positions. A key stage of the DMP that might impact market stability would be the hedging of the defaulting participant's portfolio. The design of the SwapClear DMP should help to ensure that this potential stability impact was mitigated, to the extent possible, and that no jurisdiction was unduly favoured or disadvantaged. This would be achieved through the methodology applied in neutralising the defaulting participant's portfolio, the composition of the SwapClear DMG, and the design of the auction process, as well as through the design and use of fire drills:

- The SwapClear DMG would attempt to eliminate as much of the risk in the defaulter's portfolio as quickly as possible. This should serve to minimise losses on the portfolio; the timing of hedging activity may also influence any market impact from the hedging trades. The DMG would hedge the biggest risks from the defaulter's portfolio first. In the default of a large Australian participant, this could mean that the DMG would hedge the AUD portfolio first.
- The SwapClear DMG would have the ability to second a trader with specific experience in hedging a particular currency, such as AUD, if required. LCH.C Ltd has informed the Bank that traders seconded to the DMG would typically have primary experience in EUR, USD and GBP, which are likely to be the biggest portfolios and the likely source of most of the risk to SwapClear after a participant default. However, since market conventions are sufficiently similar across currencies,

LCH.C Ltd is confident that an experienced trader would be able to hedge AUD positions effectively. In addition, LCH.C Ltd seeks confirmation from DMG members regularly that they would be comfortable hedging indicative portfolios in each currency. The ability of the DMG to quickly and efficiently hedge the portfolio of a defaulting participant should help to minimise any resulting market movements and flow on effects to financial stability.

- Auctions for a given currency would be held in the appropriate time zone for that currency.
- SwapClear included seven currencies in its February 2015 fire drill, including an AUD portfolio. Accordingly, the SwapClear DMG and participants with AUD portfolios have tested their ability to respectively hedge, and value and bid on, an AUD portfolio.

LCH.C Ltd has informed the Bank that if an Australian clearing participant defaulted, the SwapClear DMP would run as normal and that there would be no particular changes required. The Bank expects periodically to engage with LCH.C Ltd regarding how its crisis management arrangements take appropriate account of Australian stability interests.

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 (or 'clients') positions and collateral to be segregated from those of its clearing participant and to be ported if its original clearing participant defaulted or became insolvent (CCP Standard 13.1). The SwapClear service offers a number of account options that provide different combinations of position and collateral segregation (CCP Standard 13.2).

LCH.C Ltd has a number of arrangements in place to increase the likelihood that a defaulting clearing participant's client's positions and collateral could be ported to another clearing participant. For example: SwapClear currently knows the identities of its clearing participants' direct clients (i.e. clients of clearing participants); it encourages its clearing participants' clients to nominate a backup clearing participant to which its positions would be offered if its clearing participant defaulted (clients can nominate up to three backup clearing participants); and would provide a defaulting clearing participant's clients time to find a backup clearing participant if they did not have one (CCP Standard 13.3). LCH.C Ltd discloses its rules, policies and procedures about the segregation of a clearing participant's clients' positions and related collateral (CCP Standard 13.4).

During the 2014/15 Assessment period, LCH.C Ltd provided legal analysis to the Bank and ASIC in support of it permitting Australian clearing participants to offer client clearing services. This work has been finalised and Australian clearing participants are now able to offer client clearing services, subject to internal risk governance approval from LCH.C Ltd. This has now been granted to one Australian clearing participant, which began client clearing for one client in November 2015. LCH.C Ltd is encouraged to continue its dialogue with the Bank on its broader client clearing arrangements, including its ongoing testing and review of arrangements to support the porting of client positions in the event of a participant default.

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 clients' positions and collateral from the default or insolvency of that clearing participant. LCH.C Ltd has informed the Bank that a client'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 client (i.e. from fellow client risk) depends on the specific SwapClear account type (see CCP Standard 13.2 for a detailed explanation of the alternative account types offered). As noted in CCP Standard 13.2, LCH.C Ltd has legal arrangements in place that are intended to entitle LCH.C Ltd to deal with a client's positions and collateral in a way that recognises the beneficial entitlement of the client and protects the client from a defaulting clearing participant's insolvency estate.

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.

Under EMIR regulations, CCPs are required to offer clients the option of both individual segregation and omnibus segregation. To meet EMIR requirements, individually segregated accounts must protect each client's assets using the so-called 'asset segregation' model. Under this model, specific assets lodged as collateral are recorded into each client's account with its clearing participant. Those specific assets could then potentially be ported to another clearing participant along with the client'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 client's lodged collateral is protected, but the client is not identified with, and therefore is unlikely to have returned to it, the specific assets that it has lodged.

LCH.C Ltd offers three broad types of client accounts: an Individual Segregated Account (ISA); an Omnibus Segregated Account (OSA) using gross margin; and an OSA using net margin.⁷⁸ The accounts differ in the extent to which each individual client's positions and collateral are segregated from those of other clients (i.e. the degree of protection from fellow client 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 direct clients is described below. SwapClear clearing participants are free to choose which of these accounts they offer their clients, although they are obliged under EMIR to offer their clients 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 client 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-

⁷⁸ SwapClear also offers the CFTC-recognised FCM model of clearing participation, under which clearing services are offered to clients using the legally separated operationally comingled (LSOC) model. This model seeks to legally segregate clients from other clients, and to ensure that in the event of a default a client's positions and assets cannot be used to meet the obligations of any other party.

cash assets lodged in respect of the client are recorded and which would thereby be segregated for that client's benefit upon its clearing participant's default. In addition, a client's excess margin is posted to the CCP and segregated from the margin of other clients and clearing participants. If, in the event of a clearing participant default, the positions of each of the defaulting clearing participant's ISA clients needed to be ported to another clearing participant, each client's specific non-cash collateral assets could be transferred alongside its positions (rather than solely the value of lodged collateral).

- *Gross omnibus.* The Gross OSA is a value-segregated account. Within the account, client 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.⁷⁹ 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 client with positions in an individual position set is not exposed to other client's positions. Although a client with positions in a joint position set is exposed to fellow client risk from other clients' 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 and clients. In the event of a clearing participant default, the extent to which clients within the Gross OSA are exposed to losses on lodged collateral would depend on the size of the loss. If aggregate liquidation proceeds were sufficient to cover aggregate margin requirements, all clients would share the loss (such that the clearing participant's administrator would receive a smaller excess of liquidation proceeds over margin requirements). However, if aggregate liquidation proceeds did not cover aggregate margin requirements, losses would be allocated based on the default waterfall (see CCP Standard 12.1). If, in the event of a clearing participant default, the positions of the defaulting clearing participant's Gross OSA clients 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 client with positions in a Net OSA is exposed to fellow client risk from the positions of other clients 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 clients within that account, rather than in favour of individual clients. 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 clients 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 clients (i.e. the clients of clearing participants' clients) in the form of an indirect omnibus segregation account. LCH.C Ltd has informed the Bank that positions of all indirect clients of each direct client would be held in an omnibus sub-account specific

⁷⁹ Although clients 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 clients with positions in that set or account.

to that direct client. Initial margin is called on a net basis across all the indirect clients' positions in that sub-account.

In order to register trades into the SCCS, the clearing participant or direct client must provide certain information to SwapClear about the direct client, such as the 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 clients, beyond identification of the direct client with which they are associated.

As discussed under CCP Standard 4.4, in March 2015, LCH.C Ltd introduced an optional client buffer as part of its SCCS for its client accounts. In the case of a clearing participant default, any client buffer allocated to a client account may be ported by LCH.C Ltd to a backup clearing participant (along with the client's positions and collateral) or used to cover potential losses on that client account.

SwapClear has arrangements in place that are intended to protect the interests of clients 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 client. 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 client'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 participants that wish to offer client 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 clients, which is enforceable in the event of a default of the clearing participant (over the client's collateral or value of collateral, as appropriate).

As noted in CCP Standard 1.4, LCH.C Ltd has provided legal analysis to the Bank and ASIC regarding its ability to enact its default rules, as they relate to client clearing, in the event of a default of an Australian clearing participant. Among other things, these default rules provide for LCH.C Ltd to transfer a defaulting clearing participant's client's positions and collateral to a non-defaulting clearing participant or to terminate and close out those positions and return any remaining collateral to the client.

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.

To protect clients in the event of default of a SwapClear clearing participant, LCH.C Ltd has arrangements in place to enable positions, initial margin and the 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. Clients are encouraged to nominate at least one backup clearing participant to which its positions would be offered if its clearing participant defaulted (clients can nominate up to three backup clearing participants).⁸⁰ Although it is not common practice for backup clearing participants to guarantee to accept transferred trades, the likelihood of portability is increased because nominated backup clearing participants would have an established relationship with the client and operational arrangements in place. If a client's nominated backup clearing participant was also in default or a

⁸⁰ Under the FCM model, LCH.C Ltd would seek to port the participant's clients to another FCM clearing participant, under advice and approval from the CFTC.

backup clearing participant had not been nominated prior to the default, the client would be given the opportunity to find an alternative clearing participant (see CCP Standard 12.1). LCH.C Ltd's rules do not allow it to close out a client'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 client positions and collateral can be closed out.⁸¹

If a clearing participant default occurred, SwapClear Client Services would confirm with each individual client of the defaulted clearing participant whether it intended to transfer or liquidate its positions. If a client intended to transfer, SwapClear Client Services would confirm with the client 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 client'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 may be closed out. The likelihood of portability would also be partly contingent on the type of client account in which the positions and collateral were held. Positions and collateral held in accounts with other clients – that is, a Net OSA or a joint position set within a Gross OSA – could only be ported if all positions of all clients 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 client – 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.

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 DMPs (see CCP Standard 12.4). During August 2015, LCH.C Ltd also conducted an additional test of its ability to port client positions following a default. The test simulated the simultaneous default of the two largest client clearing participants in the SwapClear service. In the exercise, all porting activities were able to be completed within the DMP timeline, while maintaining business as usual functionality. LCH.C Ltd has identified that a significant number of actions would need to be taken to port client accounts following the default of a clearing participant. The porting process could potentially be challenging for a clearing participant that had a large number of clients. Nevertheless, LCH.C Ltd has informed the Bank that the results of its testing provide comfort regarding its ability to handle such porting for its current clearing membership. In the event that there were early warning signs regarding a material deterioration of the credit quality of a clearing participant, LCH.C Ltd may also seek to proactively manage client porting prior to any default. LCH.C Ltd is also conducting a review of its process for updating client contact information (see CCP Standard 18.1).

LCH.C Ltd is encouraged to continue its dialogue with the Bank on its broader client clearing arrangements, including its ongoing testing and review of arrangements to support the porting of client positions in the event of a participant default.

SwapClear also supports the ability of clients 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 5.00 pm UK time on day 0. Requests are initiated by the clearing participant receiving the positions (the receiving clearing participant) and made to SwapClear

81 LCH.C Ltd takes into account the additional time required to port a client's positions and collateral in other ways, for example, by extending the assumed hold-out period by an additional two days for client accounts when calculating initial margin requirements (see CCP Standard 6.3).

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 client. The receiving clearing participant is required to approve the transfer of positions and collateral by 5.00 pm UK 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 client of good standing from transferring its positions to another clearing participant. There are, however, provisions to prevent a client that is in breach of its financial obligations to the clearing participant, or that is insolvent or bankrupt, from transferring its positions.

13.4 A central counterparty should disclose its rules, policies and procedures relating to the segregation of a participant’s customers’ positions and related collateral. In particular, the central counterparty should disclose whether customer collateral is segregated on an individual or omnibus basis. In addition, a central counterparty should disclose any constraints, such as legal or operational constraints, that may impair its ability to segregate or port a participant’s customers’ positions and related collateral.

LCH.C Ltd discloses its rules, policies and procedures about the segregation of a clearing participant’s clients’ positions and related collateral. In particular, LCH.C Ltd publishes a specific disclosure document on its website about the segregation and protection offered by its different client accounts, which it is required to do to meet its obligations under EMIR. In that document, LCH.C Ltd discloses relevant legal or operational constraints, such as exposure to fellow counterparty risk and arrangements surrounding the porting of positions and collateral held under omnibus segregation. It also publishes on its website a plain-language description of the various client accounts it offers. The information disclosed is intended to cover the levels of client protection offered, segregation and portability arrangements and any risks or uncertainties associated with such arrangements. LCH.C Ltd also makes more detailed information regarding its account offerings available to SwapClear clearing participants and clients.

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 management and control systems in place to identify, monitor and manage general business risks (CCP Standard 14.1). LCH.C Ltd has allocated liquid net assets funded by equity to enable it to continue operations and services if it incurred general business losses and to implement its Recovery Plan and Wind-down Plan (CCP Standards 14.2, 14.3). Specifically, LCH.C Ltd has capital set aside to cover risks including operational and legal risks, credit risks, 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 Risk Policy (CCP Standard 14.4). LCH.C Ltd has guidelines for capital management in place and options for raising additional capital (CCP Standard 14.5).

14.1 A central counterparty should have robust management and control systems to identify, monitor and manage general business risks, including losses from poor execution of

business strategy, negative cash flows or unexpected and excessively large operating expenses.

LCH.C Ltd identifies, monitors and manages its general business risks across all services in accordance with the LCH.C Ltd and LCH.C Group Risk Governance Frameworks (see CCP Standard 3.1). As discussed in CCP Standard 3.1, the frameworks identify the range of risks to which the CCP may be exposed. The frameworks identify 'business risk' as a unique risk, defined as the risk of a decline in business arising from declining volumes, if lower revenues cannot be offset by adjusting variable costs. The LCH.C Ltd Framework also identifies a variety of additional business risks or potential sources of loss that are not related to a clearing participant default, including:

- custody risk on LCH.C Ltd's investment in securities arising from a custodian's insolvency, negligence, misuse of assets or fraud (see CCP Standard 15)
- investment risk arising from the investment of member collateral to manage daily liquidity needs (see CCP Standard 15)
- operational risk arising from inadequate or failed internal control processes, people and systems, or from external events (see CCP Standard 16)
- legal risk arising from the potential that unenforceable contracts, lawsuits or adverse judgements can disrupt or negatively affect the operations of LCH.C Ltd
- project risk resulting in loss of earnings arising from poor execution of projects
- strategic risk arising from adverse business decisions, improper implementation of decisions or lack of responsiveness to industry changes
- reputational risk arising from the risk that potential negative publicity, whether true or not, will cause a decline in the client base, costly litigation or revenue reductions
- business continuity risk arising from the disruption of critical business or information technology (IT) processes (see CCP Standard 16)
- information security risk arising from the loss or misuse of sensitive information (see CCP Standard 16)
- regulatory and compliance risk resulting in loss of license or other penalties due to non-compliance with regulations governing CCP activities in each jurisdiction in which LCH.C Ltd operates
- pension risk arising from a rise in liabilities of the defined benefit scheme.

As noted in CCP Standard 3, LCH.C Ltd's tolerance for each risk is determined by the LCH.C Ltd Board, and risks are monitored against these tolerances. Quarterly reports on the results of this monitoring are presented to the LCH.C Ltd LMC and LCH.C Ltd Board and are also reviewed by the LCH.C Ltd ERCo. A LCH.C Group-wide report is also presented to the ExCo and LCH.C Group Board, facilitating coordination among LCH.C Group CCPs when considering, monitoring and mitigating risks, including general business risks.

Monitoring of business risk is the responsibility of the head of each service within LCH.C Ltd (i.e. the Head of SwapClear is responsible for monitoring business risks within SwapClear). LCH.C Ltd identifies key drivers of business risk and monitors these business risk drivers on a quarterly basis. The results are then reported to the LCH.C Ltd Board following each quarterly review. This monitoring of business risk also drives LCH.C Ltd's calculation of its business risk capital requirements (see

CCP Standard 14.2). To determine this, LCH.C Ltd has conducted scenario analysis concerning the potential financial impact of its business risk drivers; where changes to business risks are identified, the Finance department will reforecast business risk losses using this scenario analysis and reassess the adequacy of capital held to cover business risk. The annual budgeting and medium-term financial plan processes also assist LCH.C Ltd to identify any changes to business risk drivers.

The New Product Approval Committee (NPACo) is responsible for the assessment, challenge, monitoring, oversight and approval of proposed new products and services. The NPACo assesses new proposals in accordance with the LCH.C Group New Product Approval Process. This includes a commercial and/or business feasibility review as well as an assessment of the expected cost and benefit, regulatory requirements and associated risks of a proposed new product or service. The LCH.C Ltd CEO retains the right to veto the launch of any new products or product enhancements (see Appendix A).

14.2 A central counterparty should hold, or demonstrate that it has legally certain access to, liquid net assets funded by equity (such as common stock, disclosed reserves or other retained earnings) so that it can continue operations and services as a going concern if it incurs general business losses. The amount of liquid net assets funded by equity a central counterparty should hold, or have access to, should be determined by its general business risk profile and the length of time required to achieve a recovery or orderly wind-down, as appropriate, of its critical operations and services if such action is taken.

As at 30 June 2015, LCH.C Ltd had available capital resources of €483.4 million after the deduction of LCH.C Ltd's capital contributions to its default waterfalls.^{82,83} Of that, LCH.C Ltd has allocated total capital of €329.6 million to cover: credit and market risks not covered by dedicated financial resources (for LCH.C Ltd this includes, among other things, treasury risks (see CCP Standard 15.4)); operational risk (including legal risk); business risks; and the implementation of its Wind-down Plan. Capital allocated to cover these risks cannot be used for any other purpose, and is distinct from capital held to cover losses that may arise from a clearing participant default (see CCP Standard 4). LCH.C Ltd's capital position is calculated by the Finance department on a monthly basis and must be approved by the LCH.C Ltd CFO and reported to the LCH.C Ltd Board.

LCH.C Ltd determines the value of capital it allocates to cover these risks (which it refers to as its 'regulatory capital requirement') in accordance with EMIR, which requires it to take into account its general business risk profile. For example, LCH.C Ltd is required to calculate the business risk component of its capital requirement as the higher of 25 per cent of its annual gross operating expenses or its own assessment of capital required to cover business risks. When making its own assessment of capital necessary to cover business risk, LCH.C Ltd identifies and quantifies reasonably foreseeable business risk drivers and considers the simultaneous occurrence of two or more of these scenarios. The effectiveness of LCH.C Ltd's risk mitigation strategies are also considered when determining necessary business capital. LCH.C Ltd's calculation of its capital allocated to the implementation of its Wind-down Plan takes into account the time to implement this plan (see CCP Standard 14.3).

LCH.C Ltd's capital is invested in accordance with the LCH.C Group Investment Risk Policy (see CCP Standard 14.4).

82 LCH.C Ltd reports its capital resources as the lower of own cash, and share capital and audited resources less 'skin in the game', as required under EMIR.

83 LCH.C Ltd provides the Bank with monthly updates of these figures.

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.

LCH.C Ltd has Recovery and Wind-down Plans that set out how it would continue or cease its operations if it suffered extreme losses (see CCP Standard 3.5). The Wind-down Plan demonstrates how LCH.C Ltd could achieve an orderly wind-down within six months. As at 30 June 2015 LCH.C Ltd had allocated capital of €120.9 million, equal to six months' operating expenses, to implement this plan. The capital that LCH.C Ltd allocates to meet its regulatory capital requirements cannot be used to cover other losses (see CCP Standard 14.2).

As part of LCH.C Ltd's Recovery Plan, arrangements are in place to address non-clearing participant default losses that could arise from treasury investment losses, including in the event of the default of an investment counterparty, or various operational and business risks (see CCP Standard 3.5).

- In the case of investment-related losses caused by the default of an issuer of a debt instrument or an investment counterparty, losses up to €15 million would be allocated to LCH.C Ltd (see CCP Standard 15.4). The remainder would be allocated to clearing participants in proportion to each clearing participant's share of margin.
- Other non-clearing participant default losses would be absorbed by insurance policies held by LCH.C Group against a number of operational and business risks, including civil liability, fraud and loss of property. This insurance could be used to cover specific risks that fall within the scope of the cover. As discussed under CCP Standard 14.2, LCH.C Ltd could utilise surplus capital held against operational and business risks to cover any remaining losses.

14.4 Assets held to cover general business risk should be of high quality and sufficiently liquid in order to allow the central counterparty to meet its current and projected operating expenses under a range of scenarios, including in adverse market conditions.

LCH.C Ltd's capital is invested in accordance with the LCH.C Group Investment Risk Policy (see CCP Standard 15.4). The Investment Risk Policy specifies key investment principles of capital preservation and liquidity management. Consistent with these principles, approved investments are generally limited to: cash deposits with central banks and overnight deposits with approved commercial banks; securities issued by approved sovereigns, government guaranteed institutions or supranationals; and reverse repo transactions.

14.5 A central counterparty should maintain a viable plan for raising additional equity should its equity fall close to or below the amount needed. This plan should be approved by the board of directors and updated regularly.

LCH.C Ltd's Capital Strategy sets guidelines for capital management and outlines options for raising additional capital, if needed. In line with this strategy, LCH.C Ltd targets a minimum level of profitability to generate capital, through retained earnings. This capital is used to support business development and project spending, and pay dividends to shareholders, and would be used to absorb any unexpected losses.

The Capital Strategy also details options for generating capital to support transformative initiatives or meet capital pressures arising from infrequent events. As a wholly owned subsidiary of LCH.C Group, the LCH.C Ltd Capital Strategy is developed in consultation with the Group. Historically, equity capital has been raised at the Group level and provided to LCH.C Ltd. It is expected that any future equity capital raising would similarly occur at the Group level. Any increase in the share capital of LCH.C Group would require shareholder approval. LCH.C Ltd's Capital Strategy is reviewed and approved by the LCH.C Ltd Board each year.

In developing its Capital Strategy, LCH.C Group takes into account the insurance that it holds against a number of general business risks (see CCP Standard 14.3), as well as arrangements for the allocation of non-default losses.

Standard 15: Custody and investment risks

A central counterparty should safeguard its own and its participants' assets and minimise the risk of loss on and delay in access to these assets. A central counterparty's investments should be in instruments with minimal credit, market and liquidity risks.

LCH.C Ltd invests its own and its participants' assets with supervised and regulated entities that meet a number of operational and legal requirements (CCP Standard 15.1). LCH.C Ltd aims to ensure that it has prompt access to its assets and the assets provided by participants by conducting operational and legal due diligence on all custodians and CSDs (CCP Standard 15.2). To diversify its exposure, LCH.C Ltd uses a range of custodians and CSDs and monitors its relationships with each on a daily basis (CCP Standard 15.3). LCH.C Ltd maintains an investment strategy that is consistent with the LCH.C Group Investment Risk Policy; the strategy applies to all services, including SwapClear (CCP Standard 15.4).

The Bank will discuss with LCH.C Ltd the adequacy of its disclosure of investment risks to participants in light of its arrangements to allocate certain investment losses in excess of €15 million to participants.

15.1 A central counterparty should hold its own and its participants' assets at supervised and regulated entities that have robust accounting practices, safekeeping procedures and internal controls that fully protect these assets.

LCH.C Ltd selects the custodians at which it holds its own and participants' assets in accordance with criteria specified in the LCH.C Group Settlement, Payment and Custody Risk Policy. This policy expresses a preference that securities are held at CSDs rather than credit institutions, and that uninvested cash (if any) is held at central banks rather than other intermediaries (investment of cash is discussed in detail in CCP Standard 15.4).

Custodians and CSDs must be assigned, and maintain, an ICS below a predetermined threshold and satisfy a number of operational and legal requirements (see CCP Standard 15.2). ICSs are set and monitored on an ongoing basis by LCH.C Ltd, in accordance with the Group Counterparty Credit Risk Policy (see CCP Standard 4.2). Should the ICS of a custodian or CSD rise above the specified requirement, LCH.C Ltd may seek to use an alternative CSD or custodian, or may request internal governance approval for an exception to the policy. Exceptions must be approved by the LCH.C Ltd ERCo, and must detail how any associated risk will be mitigated. LCH.C Ltd also requires that its custodians and CSDs have sufficient supervision and accounting practices, which it verifies through a due diligence process. Intermediaries, including custodians and CSDs, must be approved by the LCH.C Ltd ERCo.

The Settlement, Payment and Custody Risk Policy is reviewed annually by the LCH.C Ltd ERCo and the LCH.C Ltd Risk Committee and must be approved by the LCH.C Ltd Board each year.

15.2 A central counterparty should have prompt access to its assets and the assets provided by participants, when required.

To ensure that it has prompt access to its assets and the assets provided by participants, LCH.C Ltd performs operational and legal due diligence on all custodians and CSDs that it uses. LCH.C Ltd's operational due diligence covers matters including BCM, service availability and data loss; its legal due diligence covers matters including client asset protection, sub-custodian appointment, internal controls and default arrangements. This due diligence is refreshed at least every two years.

LCH.C Ltd holds securities provided by clearing participants as margin collateral in accounts in its own name and under a legal charge. These arrangements seek to ensure that in the event of a participant default, LCH.C Ltd is able to access the assets without recourse to the custodian or CSD. As part of the due diligence process, the Operations and Legal departments must be satisfied that assets belonging to LCH.C Ltd are fully segregated, identifiable and accessible promptly in the event that the custodian or CSD defaulted (see CCP Standard 1.2). When accepting clearing participants in a new jurisdiction, or conducting due diligence on a non-UK domiciled custodian or CSD, LCH.C Ltd will seek legal advice for that jurisdiction. More generally, LCH.C Ltd monitors country-specific risks via its ICS framework (see CCP Standard 4.2).

LCH.C Ltd monitors the level of service provided by custodians and CSDs, and reports are provided to the LCH.C Ltd ERCo quarterly. LCH.C Ltd senior management will engage with custodians if any shortcomings are identified.

15.3 A central counterparty should evaluate and understand its exposures to its custodians, taking into account the full scope of its relationships with each.

LCH.C Ltd monitors exposures to its custodians on a daily basis; exposures to custodians are also reported to the LCH.C Ltd ERCo quarterly. To diversify its exposure, LCH.C Ltd uses a range of CSDs and custodians. This includes two major international CSDs, the UK domestic CSD and three US custodians. As discussed in CCP Standards 15.1 and 15.2, LCH.C Ltd also regularly reviews the credit standing and performance of its custodians.

LCH.C Ltd considers the full scope of its relationship with a counterparty, including clearing, investment and custodian activities, when assessing its exposure. LCH.C Ltd has a concentration limit framework in place, which requires that its total overnight exposure across clearing and investment activities with a single counterparty should not exceed a predefined proportion of LCH.C Ltd's capital resources.⁸⁴ If LCH.C Ltd's exposure to a counterparty should breach the limit, LCH.C Ltd could scale back its investment activities with that counterparty or call additional margin to reduce capital at risk from clearing activities. In addition, the Settlement, Payment and Custody Risk Policy does not allow LCH.C Ltd to hold a clearing participant's assets with a custodian that belongs to the same group as that participant. Exceptions may be granted by the ALCo and the LCH.C Ltd ERCo if a legal opinion confirming the bankruptcy remoteness of the intermediary and the segregation of assets in the event of insolvency is provided.

⁸⁴ As discussed in CCP Standard 9.3, LCH.C Ltd also requires that its intraday unsecured exposures to a commercial counterparty across investment and concentration activity should not exceed a predefined percentage of its capital resources.

15.4 A central counterparty's investment strategy should be consistent with its overall risk management strategy and fully disclosed to its participants, and investments should be secured by, or be claims on, high-quality obligors. These investments should allow for quick liquidation with little, if any, adverse price effect.

LCH.C Ltd invests cash – including cash margins, default fund contributions, paid-up share capital, and cash arising from settlement failures – in accordance with the LCH.C Group Investment Risk Policy. The key investment principles are capital preservation and liquidity management. LCH.C Ltd seeks to ensure that it can quickly liquidate its investments without significant adverse price effects by restricting investments to high quality counterparties, setting concentration limits on securities, and managing the composition of its overall investment portfolio based on investment type and maturity dates. LCH.C Ltd provides participants with high-level information on how it manages its portfolio on request.

The Investment Risk Policy restricts investments to: cash deposits with central banks and overnight deposits with approved commercial banks; securities issued by approved sovereigns, government guaranteed institutions or supranationals; and reverse repo transactions. The Investment Risk Policy permits the use of foreign exchange swaps for the purpose of managing foreign exchange risk as part of the liquidity risk management framework. Investment counterparties must maintain an ICS below a specified threshold. In practice, LCH.C Ltd invests the vast majority of its cash in secured products.

LCH.C Ltd's primary currencies for investments are EUR, GBP and USD. All cash investments must be in a currency that is used for clearing in LCH.C Ltd; to the extent possible, investments are in the same currency as the cash was received.

The rate of remuneration LCH.C Ltd provides on cash posted by its participants is determined at a service level. For SwapClear this is set at a spread below the relevant cash rate; the precise spread applied varies across currencies.

To minimise credit and liquidity risk, the Investment Risk Policy sets concentration limits on: exposures to individual counterparties, measured at the investment counterparty group level; investments representing an exposure to a particular sovereign; and exposures to reverse repo collateral by issuer and maturity. As discussed in CCP Standard 15.3, exposure to a single counterparty should not exceed a predefined proportion of LCH.C Ltd's capital resources. The Investment Risk Policy sets LCH.C Ltd's maximum acceptable exposure to interest rate risk as a percentage of its capital resources and caps the average maturity of the portfolio.

In addition, the Investment Risk Policy requires that, on average each month, at least 95 per cent of investments with commercial banks must be on a secured basis, while at least 90 per cent of investments with commercial banks must be on a secured basis at all times.

LCH.C Ltd does not invest in corporate bonds or equities, limiting the potential for wrong-way risk in the investment of participant's cash. Specific wrong-way risk haircuts may be applied to reverse repo investments if deemed necessary.

LCH.C Ltd holds capital to cover a portion of uncovered credit and counterparty credit risk, as required under EMIR (see CCP Standard 14.2). Some of this capital is held to cover investment risk, including credit risk associated with unsecured bank deposits and triparty reverse repos, as well as other credit risks related to investments. As discussed under CCP Standard 3.5 and CCP Standard 14.3, in the event of treasury investment losses arising from the default of an issuer of a debt instrument (such as a

sovereign) or the default of an investment party, losses up to €15 million would be allocated to LCH.C Ltd, with the remainder allocated to clearing participants. The Bank will discuss further with LCH.C Ltd the adequacy of its disclosure of investment risks to participants in light of these loss allocation arrangements.

The Investment Risk Policy is reviewed by the LCH.C Ltd ERCo and the LCH.C Ltd Risk Committee, and approved by the LCH.C Ltd Board, each year.

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 manages its operational risks in accordance with the overall LCH.C Group Risk Governance Framework, and the LCH.C Group Board has ultimate responsibility for the LCH.C Group operational risk appetite (CCP Standards 16.1, 16.2). LCH.C Ltd targets system availability of at least 99.71 per cent for all systems related to the operation of the SwapClear service and peak capacity utilisation of 50 per cent (CCP Standard 16.3). System availability averaged 99.62 per cent over the 2014/15 Assessment period. LCH.C Ltd experienced a number of operational incidents during the 2014/15 Assessment period, principally related to the extension of SwapClear operating hours (CCP Standard 16.5). In response the CCP has introduced and is continuing to implement a number of changes to its management of operational risk, including enhancements to its governance, change management, and incident management processes.

LCH.C Ltd maintains information security policies and has adopted LSEG's Physical Security Policy. These policies are based on relevant international standards (CCP Standard 16.3). LCH.C Ltd considers that it has sufficient, well-trained and competent personnel and other resources to operate the SwapClear service, both on a business-as-usual basis, and to perform projects and implement changes (CCP Standard 16.4). LCH.C Ltd has also implemented arrangements that seek to ensure that it has appropriate arrangements in place to manage shared resources between the LCH.C Group CCPs (CCP Standard 16.4).

LCH.C Ltd manages operational interdependencies with its participants through operational participation requirements (CCP Standards 16.4, 16.6). Dependencies on service providers are managed in accordance with the LCH.C Group Outsourcing Policy, LCH.C Group Procurement Policy and LCH.C Group Vendor Management Process, and are subject to ongoing monitoring and contingency arrangements where appropriate (CCP Standard 16.5). LCH.C Ltd requires its outsourced service providers to implement business continuity and information security arrangements equivalent to its own, and clauses in LCH.C Ltd's legal agreements with its critical service providers provide rights of access to information for the BoE and LCH.C Ltd's other regulators (CCP Standards 16.9, 16.10). LCH.C Ltd assesses critical service providers against its own policies and standards.

LCH.C Ltd maintains business continuity arrangements that provide a high degree of redundancy and, through the use of multiple data centres, target the resumption of operations within two hours following disruptive events. These arrangements are regularly tested (CCP Standard 16.7). Participants are required to maintain appropriate operational and business continuity arrangements, and

LCH.C Ltd tests these arrangements on an annual basis (CCP Standard 16.8). LCH.C Ltd also tests business continuity arrangements with critical service providers on a regular basis (CCP Standard 16.9).

Since LCH.C Ltd is a UK-based CS facility, any crisis management actions would be led by the BoE in its role as LCH.C Ltd's primary regulator or as the UK resolution authority (CCP Standard 16.11).

LCH.C Ltd has carried out an extensive program of work throughout the Assessment period as it seeks to enhance its resilience to operational risk. The Bank has set a regulatory priority that LCH.C Ltd should continue work to enhance its operational resilience and operational risk management. LCH.C Ltd should continue to implement recommendations arising from recent internal and external operational risk reviews. The BoE has also identified operational risk as a supervisory priority across all of the financial market infrastructures (FMIs) it supervises. The Bank therefore expects to engage actively with the BoE on this priority.

LCH.C Ltd is also encouraged to continue its dialogue with the Bank on its cyber risk management arrangements. As part of this, the Bank expects LCH.C Ltd to review its cyber risk management arrangements in light of forthcoming CPMI-IOSCO guidance on cyber resilience for FMIs. The BoE has also identified cyber risk as a supervisory priority across all the FMIs it supervises. The Bank therefore also expects to engage actively with the BoE on this priority.

In accordance with the Bank's 2014/15 priorities, during the period LCH.C Ltd continued its work to extend its operating hours and operational support to the Australian time zone. LCH.C Ltd extended the opening time of the SwapClear service in late 2014 from 7.30 am to 5.00 am UK time (4:30 pm to 2.00 pm AEST). However, following several operational incidents that resulted in the late opening of the service, the opening time was wound back to 6.00 am UK time (3.00 pm AEST). LCH.C Ltd is considering options to further extend SwapClear's operating hours. The Bank expects LCH.C Ltd to continue its work to extend the operating hours of the SwapClear service, while ensuring the safety and resilience of its operations.

Identifying and managing operational risk

16.1 A central counterparty should establish a robust operational risk management framework with appropriate systems, policies, procedures and controls to identify, monitor and manage operational risks.

LCH.C Ltd's operational risk policies and controls have been developed in accordance with the overall LCH.C Group Risk Governance Framework (see CCP Standard 3.1). LCH.C Group maintains an Operational Risk Policy (ORP). The ORP contains the principles and standards for the identification, assessment, management, reporting and monitoring of operational risks facing all CCPs within the LCH.C Group. The ORP is supported by the Operational Risk Manual (ORM), which contains the LCH.C Group procedures and systems for the identification, assessment, management, reporting and monitoring of operational risks. As with the ORP, the ORM applies to all LCH.C Group CCPs, including LCH.C Ltd.

LCH.C Group uses a 'three lines of defence' approach to assign responsibilities for monitoring and managing operational risks:

- Primary responsibility for the day-to-day identification and management of operational risks – the first line of defence – lies with LCH.C Ltd's business lines and management services. These include the SwapClear Risk, Operations and IT departments, which are responsible for designing,

operating and maintaining effective systems of internal controls to address these risks (subject to the confines of the ORP and ORM). Appointed staff within each area are responsible for ensuring that the risk profile for their business line is current and that the Business Head approves actions in relation to risks outside appetite. Business Heads have responsibility for regularly reviewing information relating to the operational risk profile of their business line, for ensuring that all material risks are identified and that such risks and the corresponding controls and mitigating actions are properly recorded and current. Relevant policies and procedures are discussed in more detail below.

- Responsibility for the second line of defence lies with the LCH.C Group Operational Risk department (ORD). The ORD sits within Group Risk and reports to the LCH.C Group CRO. The ORD produces a monthly Group Operational Report, provides operational risk policy support to each LCH.C Group business line and maintains the ORP and ORM (see CCP Standard 16.2).
- The third line of defence comprises the LCH.C Ltd Internal Audit department and Audit Committee. The Internal Audit department validates the management of operational risks within LCH.C Ltd (see CCP Standard 16.2). The LCH.C Ltd Audit Committee's charter includes requirements for maintaining, reviewing and strengthening LCH.C Ltd's system of internal controls and operational risk framework.

In 2015, LCH.C Ltd appointed a COS, whose role includes responsibilities for the identification and reduction of operational risk in conjunction with the LCH.C Ltd Head of Operational Risk, and the resolution of operational issues in conjunction with the Internal Audit department.

LCH.C Ltd has procedures in place to identify operational risks facing the CCP on an ongoing basis. The LCH.C Group ORD requests that staff within the SwapClear service submit control performance reports and Key Risk Indicators quarterly, as well as conducting first-line control assurance and a Risk and Control self-assessment. Second-line control assurance is conducted by the ORD.

LCH.C Ltd also maintains an Incident Management Process that documents the procedures, roles and responsibilities for recording, reporting, and resolving operational, security and information technology incidents affecting the SwapClear service (see CCP Standard 16.7). Operational risk identification is also addressed in LCH.C Ltd's Change Management Framework (see CCP Standard 16.2).

Where an operational risk is identified, it is assessed and rated according to an impact and likelihood matrix that takes into account financial, reputational and regulatory criteria. When a risk is assessed to be above LCH.C Group's risk appetite, a mitigation plan must be developed and implemented to bring the risk within the specified risk appetite. The LCH.C Group Board is responsible for determining the LCH.C Group appetite for operational risk (see CCP Standard 16.2).

LCH.C Ltd has conducted several reviews of its management of operational risk over recent periods (see CCP Standard 16.2). The Bank has set a regulatory priority for the 2015/16 Assessment period that LCH.C Ltd should continue work to enhance its operational resilience and operational risk management. LCH.C Ltd should continue to implement recommendations arising from recent internal and external operational risk reviews. The BoE has also identified operational risk as a supervisory priority across all of the FMIs it supervises. The Bank therefore expects to engage actively with the BoE on this priority.

16.2 A central counterparty's board of directors should clearly define the roles and responsibilities for addressing operational risk and should endorse the central counterparty's operational risk management framework. Systems, operational policies,

procedures and controls should be reviewed, audited and tested periodically and after significant changes.

The LCH.C Group Board has ultimate responsibility for the LCH.C Group operational risk appetite, standards and policies, as defined in the Board's charter (see CCP Standard 3.1). The LCH.C Group operational risk appetite and ORP are reviewed annually by the ORD, and any changes must be approved by the LCH.C Group Board. Changes to the ORP must also be approved by the boards and risk committees of each of LCH.C Group's CCPs, including LCH.C Ltd, as well as LCH.C Group Audit and the ERCos.

The Head of the ORD is the owner of the ORP and ORM. The ORP and ORM were last reviewed by the ORD in October 2014 and March 2015, respectively. The ORP and ORM were also revised in October 2014, to align the LCH.C Group and LSEG operational risk management frameworks following an external review of LCH.C Group's internal controls in August 2014 (see below).

LCH.C Ltd's operational risk profile is subject to periodic internal and external reviews. LCH.C Ltd's Internal Audit department conducts annual audits of LCH.C Ltd's operational risk profile. Where issues are identified, a remediation plan is put in place and tracked by the Internal Audit department. The Internal Audit department also monitors compliance with the ORP and ORM, and reports to the LCH.C Ltd Audit Committee on these findings.

As discussed in the Bank's 2013/14 Assessment, LCH.C Ltd conducted an internal review of operational risk in the SwapClear service in 2013. None of the internal review's recommendations were identified by LCH.C Ltd as business critical. The vast majority of recommendations arising from the review have since been implemented, though a small number of outstanding action items are planned for implementation in 2016.

In late 2014 there was a material increase in the number of operational incidents. Although there was no single cause for these operational incidents, a number were related to an extension in the operating hours of the SwapClear service and often involved delayed openings and trade registration disruptions (see CCP Standard 16.3). An Independent Controls Review was undertaken by an external consultancy firm on behalf of LCH.C Group in August 2014. Following the review, LCH.C Ltd implemented a number of changes based on the themes covered by the review, including:

- a new Change Management Framework to standardise governance of projects
- revision of the Incident Classification prioritisation and Materiality Matrix
- strengthening the Operational Risk Framework across the Group including monitoring, reporting and governance arrangements
- strengthening data management and governance, by establishing better data risk controls and practices to enhance data integrity.

LCH.C Ltd's Internal Audit department will review the implementation of these changes; LCH.C Ltd expects this to be completed by the end of 2015.

During the first half of 2015, LCH.C Ltd also conducted a review of the SwapClear IT platform and associated architecture, shared technology and processes. The review made a number of recommendations with regard to platform improvements, change management, process automation and risk governance. Implementation of the specific recommendations made is already planned or underway. The LCH.C Ltd management response to the review has been approved by the LCH.C Ltd LMC and will be presented to the Group Audit Committee in the coming period.

As noted above, LCH.C Ltd implemented a new Change Management Framework in 2015. The Change Management Framework sets out policies and processes for the assessment of potential changes to systems, including risk impact and analysis, quality assurance testing and implementation reviews. The objective of the framework is to ensure that projects and changes to systems are implemented effectively, and with regard to operational risk within LCH.C Ltd.

In accordance with the LCH.C Ltd Change Management Framework, changes and projects are assessed based on their organisational importance, urgency and complexity, and assigned one of three levels of priority (low, high or critical). Changes in all three priority categories are reviewed and approved by the LCH.C Ltd IT Change Advisory Board, which consists of IT staff and management. High or critical priority changes are also reviewed and approved by the LCH.C Ltd Change Management Committee, which consists of senior management from IT and each of the LCH.C Ltd clearing services (including SwapClear).

LCH.C Ltd operates a 'hub and spokes model' approach to project management. The LCH.C Group Projects Team, which sits within the LCH.C Group Technology and Operations department, oversees the overall LCH.C Group portfolio of change, including projects with a group-wide scope. The LCH.C Group Projects Team is also responsible for defining the governance and delivery framework for projects. There are also project management responsibilities embedded within each of the LCH.C Ltd clearing services (including SwapClear) and support functions (e.g. finance, IT). Projects can therefore be managed by the Group Projects Team or within LCH.C Ltd, and ownership is driven by the scope of the project.

In 2015, LCH.C Ltd also implemented a new Test Framework, to promote consistent quality controls and governance arrangements for testing changes to LCH.C Ltd's systems before these changes are implemented. The Test Framework implements a standardised process for testing, quality control and documentation, and is intended to complement the Change Management Framework. The Test Framework is scalable depending on the priority of the change being tested. General guidelines for acceptance criteria are outlined in the Test Framework, and include references to the SwapClear Service Level Agreement (SLA), which is an internal LCH.C Ltd document that defines the expected availability and performance of the SwapClear service (see CCP Standard 16.3).

The ORP and ORM take into account the Basel II requirements, EMIR and the CFTC's *Core Principles for Derivatives Clearing Organisations*. LCH.C Ltd's Test Framework is benchmarked against ISO 29119-1:2013 *Software and Systems Engineering – Software Testing*. The LCH.C Group Information Security Policy (see CCP Standard 16.3) is aligned with ISO 27001:2013 *Information Security Management* and ISO 27002:2013 *Information Technology – Security Techniques* standards. LCH.C Ltd and LCH.C Group policies relevant to business continuity management of the SwapClear service are benchmarked to ISO 22301:2012 *Societal Security – Business Continuity Management Systems* (see CCP Standard 16.7).

16.3 A central counterparty should have clearly defined operational reliability objectives and should have policies in place that are designed to achieve those objectives. These policies include, but are not limited to, having: exacting targets for system availability; scalable capacity adequate to handle increasing stress volumes; and comprehensive physical and information security policies that address all potential vulnerabilities and threats.

Operational reliability and availability

LCH.C Ltd documents operational reliability objectives through availability targets for the SwapClear service, which are formally defined in its SLA. LCH.C Ltd targets IT system availability for the SwapClear service equivalent to at least 99.71 per cent, i.e. system unavailability of no more than 60

minutes in any one calendar month.⁸⁵ SwapClear met this target in 10 of the 15 months in the Assessment period. However, over the period as a whole, IT system availability averaged 99.62 per cent. LCH.C Ltd experienced a material increase in operational incidents within the SwapClear service in late 2014, a significant proportion of which arose from the extension the operating hours of the SwapClear service. LCH.C Ltd has taken remedial action for each of the incidents that occurred in the Assessment period. A number of system improvements aimed to prevent future operational issues were incorporated into a planned system upgrade in October 2015.

Operational capacity

LCH.C Ltd targets a maximum capacity utilisation of 50 per cent for the SwapClear service. LCH.C Ltd deems its capacity utilisation target to be met if the service has the capacity to handle the greater of: two times current daily average throughput; or the projected daily average throughput in 12 months' time. This target was met in each month over the Assessment period.

LCH.C Ltd monitors system capacity in accordance with the LCH.C Group Capacity Management document. This document describes how LCH.C Ltd seeks to reduce the risk to performance of its clearing services due to potential changes in capacity. The LCH.C Ltd IT department is responsible for collating weekly and monthly capacity and performance data, which are reported to senior IT management. These data are also reported to the LCH.C Ltd Board. Capacity targets are adjusted if surpassed by the most recent peak load. In accordance with the Change Management Framework and Test Framework, forecasts of the resulting capacity of the SwapClear service are required before a project or change is implemented.

Physical and information security

LCH.C Group maintains an Information Security Policy. The objective of this policy is to ensure the availability of the LCH.C Ltd Group CCPs' critical business applications through implementation of technical, physical, procedural and personnel controls, which provides protection around the integrity and confidentiality of the key information that they use, store and disseminate. The policy is reviewed and approved annually by the LCH.C Ltd LMC following material and organisational changes. All LCH.C Group employees, employees at each of LCH.C Group's CCPs, contractors, temporary staff members and third party service providers are contractually required to comply with the LCH.C Group Information Security Policy and all supporting standards. Oversight of LCH.C Ltd's approach to information security is governed by the LCH.C Group Cyber Security and Continuity Committee (CSCC), which provides advice and develops guidance in accordance with the Group Information Security Policy. This committee includes the LCH.C Group CCPs' Chief Operating Officers (COOs) and the COOs of the LCH.C Group CCP clearing services.

LCH.C Ltd's approach to information security is intended to be sufficiently flexible to allow for continual adjustment to its cyber resilience by incorporating new information from internal and external risk-based threat assessments, as well as cross-industry collaboration and intelligence gathering. LCH.C Ltd maintains a suite of controls designed to prevent and detect cyber attacks on its systems, such as denial of service attacks or malware threats. These include: steps to monitor suspicious internet traffic; the provision of spare network capacity in the event of a denial-of-service

85 LCH.C Ltd applies a weighting system when calculating service unavailability: a weight of one is applied to minutes for which there is full service outage; a weight of 0.5 or 0.25 is applied for partial outages, depending on the nature of the incident; and a weight of zero is applied for losses of resilience (i.e. when the service is still operating but, for example, an additional server used to share the load becomes unavailable).

attack; and other access controls to regulate access to LCH.C Ltd's systems. LCH.C Ltd's systems are subjected to regular vulnerability analysis.

User access to LCH.C Ltd's IT and systems is restricted to prevent inappropriate or unauthorised access to application software, operating systems and underlying data. User access is controlled in accordance with the LCH.C Ltd User Access Level Controls Framework, which is based on a balance of business and security needs, and the principle of 'least privilege necessary'. Access to important information-processing facilities (including physical access) is only granted to authorised uniquely identified individuals.

As noted above, the LCH.C Group CSCC is responsible for oversight of LCH.C Ltd's approach to information security, including cyber risk. The CSCC meets quarterly, and issues identified by the CSCC can be escalated through the Group CCPs' LMCs, Audit Committees and Boards. Updates to the Group's Information Security Policy are signed off by each of these committees. Such updates are proposed by the Group Security function, which provides subject matter expertise on cyber risk.

LCH.C Ltd is encouraged to continue its dialogue with the Bank on its cyber risk management arrangements. LCH.C Ltd is also encouraged to review its cyber risk management arrangements in light of forthcoming CPMI-IOSCO guidance on cyber resilience for FMI. The BoE has also identified cyber risk as a supervisory priority across all the FMI it supervises. The Bank therefore also expects to engage actively with the BoE on this matter.

LCH.C Ltd implements physical security arrangements in accordance with the LSEG Physical Security Policy. Physical access to all LCH.C Ltd systems and infrastructure is controlled at both an enterprise and departmental level. The key systems supporting LCH.C Ltd's clearing and settlement processes are operated within secure buildings. Clearing operations are separated from general office areas with permitted access determined, documented and maintained at a senior manager level. Physical security arrangements for the primary and backup data centres are broadly equivalent.

16.4 A central counterparty should ensure that it can reliably access and utilise well-trained and competent personnel, as well as technical and other resources. These arrangements should be designed to ensure that all key systems are operated securely and reliably in all circumstances, including where a related body becomes subject to external administration.

Access to resources

LCH.C Group has a Recruitment Policy in place which sets rigorous pre-employment screening for any prospective LCH.C Group employees. Employees of LCH.C Group, including LCH.C Ltd, are subject to performance reviews at least annually. The standards of performance against which LCH.C Ltd employees are assessed take into account knowledge of LCH.C Ltd's relevant systems and processes. LCH.C Ltd's performance review process is also used to identify the training needs of staff.

LCH.C Group has an Anti-Fraud Policy in place designed to identify and manage potential sources of fraud. This policy includes mitigation techniques and procedures to be followed in the event that a fraud or potential fraud is reported to LCH.C Ltd. LCH.C Group also has a Code of Conduct that applies to the employees of all LCH.C Group legal entities, including LCH.C Ltd. The Code of Conduct explicitly addresses unethical behaviour, including fraud against LCH.C Group and insider trading.

LCH.C Ltd ensures that it has adequate staff to manage operational incidents and disruptions alongside day-to-day business-as-usual processes through the establishment of dedicated Incident Management Teams within the IT departments. Potential scenarios requiring the transfer of responsibilities to alternative work area recovery locations are documented in the LCH.C Group Threat Assessment document (see CCP Standard 16.7). As noted under CCP Standard 2.5, LCH.C Ltd

has a talent management process in place, covering talent acquisition, succession planning and key person risk assessments. Risks identified in the key person risk assessment are managed through various initiatives.

The SwapClear SLA includes targets for system capacity and performance, to ensure that the CCP has sufficient technical and other resources to operate the service effectively (see CCP Standard 16.3). Planned system changes must meet the requirements of the SLA prior to implementation, with many of these changes specifically aimed at improving the performance of the SwapClear service against the SLA.

Resources shared with a related body

LCH.C LLC and LCH.C SA provide US-based and euro area-based staff, respectively, for LCH.C Ltd in relation to the SwapClear service. Under the terms of this arrangement, accountability for all services outsourced to alternative LCH.C Group entities resides with LCH.C Ltd. LCH.C Ltd is required to retain sufficient resources to ensure that all clearing services could be run without the services provided by the other Group CCPs. LCH.C LLC's or LCH.C SA's provision of services to LCH.C Ltd may only be terminated if a minimum period of notice is provided to LCH.C Ltd.

LCH.C Ltd also receives services, on a 'pass through' basis, from LCH.Clearnet Luxembourg (LuxCo) – a company jointly owned by LCH.C Ltd and LCH.C SA. LuxCo holds certain third party licences and associated support agreements under which LCH.C Ltd is entitled to benefit. Should one entity fail, the other would retain access to the third party licences, although may be required to meet any shortfall for the continued operation of LuxCo.

LSEG has also announced that it intends to launch a SSC which will provide shared technology and support services across all LSEG entities, including LCH.C Ltd. The Bank will engage with LCH.C Ltd regarding this initiative over the coming period.

Major projects

LCH.C Ltd conducts an annual planning process to determine its targets and budgeted resources for the following year, for both business-as-usual and change activities, based on the overall priorities for the CCP. Resource requirements for projects are estimated as part of the Change Management Framework, and additional resources factored into the project budget. In addition, workshops are held with each support function (e.g. finance, IT) within LCH.C Ltd to review resource demands arising from projects, to ensure that sufficient resourcing has been factored into project budget forecasts. Plans and forecasts are formally reviewed on a quarterly basis as part of the formal LCH.C Ltd Quarterly Business Review process.

16.5 A central counterparty should identify, monitor and manage the risks that key participants, other FMIs and service and utility providers might pose to its operations. A central counterparty should inform the Reserve Bank of any critical dependencies on utilities or service providers. In addition, a central counterparty should identify, monitor and manage the risks its operations might pose to its participants and other FMIs. Where a central counterparty operates in multiple jurisdictions, managing these risks may require it to provide adequate operational support to participants during the market hours of each relevant jurisdiction.

Dependencies on clearing participants and other FMIs

LCH.C Ltd monitors, identifies and mitigates potential dependencies on clearing participants in a number of ways: by its general monitoring of risks under the risk management framework (see

CCP Standard 3.1); participation requirements related to operational capabilities (see CCP Standard 16.6); and by requiring all clearing participants to take part in periodical LCH.C Ltd and LCH.C Group BCM testing (see CCP Standard 16.7).

LCH.C Ltd has policies and procedures in place to mitigate operational risks arising from the PPS banks, correspondent banks and concentration banks that comprise its PPS system (see CCP Standard 9), and relationships with its custodian banks, CSDs and securities settlement systems (see CCP Standard 15).

Dependencies on service providers

Any outsourcing by LCH.C Ltd is governed by the LCH.C Group Outsourcing Policy, which sets out the requirements that must be met when an LCH.C Group CCP is outsourcing, or considering outsourcing, services to an external service provider. This policy ensures that, when a service provider is engaged, minimum contractual requirements are applied that take into account the identification and monitoring of operational risks to LCH.C Ltd. Minimum contractual requirements include: service level agreements with defined standards of performance; notification provisions in relation to service-affecting incidents and service remediation mechanisms; appropriate exit clauses and handover provisions; protection of confidential information, including that the service provider implements equivalent information security requirements to those of LCH.C Ltd (as defined in the Information Security Policy); and notification requirements in relation to planned changes to the service, including decisions by a service provider to outsource its services. Contractual agreements must also ensure adequate audit rights for LCH.C Ltd, including on-site access, and specify an audit program with a schedule of routine audits. In addition, all LCH.C Ltd service providers are required to implement business continuity arrangements equivalent to those of LCH.C Ltd (see CCP Standard 16.9).

The contractual requirements defined above must be met in accordance with the broader LCH.C Group Procurement Policy, which specifies the due diligence standards that LCH.C Ltd must meet in relation to the mitigation of operational risk with respect to external service providers. The Procurement Policy requires that all contracts related to outsourcing must be reviewed and approved by the LCH.C Ltd Legal department. LCH.C Ltd's due diligence process for suppliers also involves the engagement of specialist functions such as the LCH.C Group Business Continuity and Information Security departments.

The LCH.C Group Vendor Management Process governs the selection of external service providers by LCH.C Ltd, and ongoing management of these relationships. The Vendor Management Process requires that LCH.C Ltd: retain appropriate expertise and adequate resources that are independent of the service provider to properly manage the service provider; review its own business continuity and disaster recovery plans in light of any new arrangements with a service provider; put measures in place to support escalation and resolution of disputes with the service providers; and put in place an audit programme for service providers.

The LCH.C Ltd Board must be notified of all proposals to outsource any business function to a service provider, and of material changes to existing outsourcing arrangements. The LCH.C Ltd Board and the LCH.C Group Board must be notified of all operational incidents relating to existing service providers. For activities linked to the management of risks in relation to LCH.C Ltd's clearing business, new arrangements with external service providers require the approval of LCH.C Ltd's regulators and the LCH.C Group Compliance department.

LCH.C Ltd has informed the Bank that, in designing the above policies, LCH.C Group had regard to the CPMI-IOSCO *Assessment Methodology for Oversight Expectations Applicable to Critical Service Providers*.⁸⁶

LCH.C Ltd uses services from several external service providers:

- *Market data providers.* LCH.C Ltd maintains direct connectivity from each of its data centres to all of its data providers. In the event that one of LCH.C Ltd's data providers was unable to provide data to LCH.C Ltd, LCH.C Ltd would seek data from alternative sources or use proxy data.
- *Platform infrastructure provider.* The clearing platform infrastructure used for the SwapClear service is provided by a third-party vendor. All application support and development is performed by LCH.C Ltd. Where application support or development relies on core provider code, LCH.C Ltd would escalate this to the provider's support function. LCH.C Ltd maintains direct connectivity to the provider from each of its data centres. LCH.C Ltd has in place contractual rights with the provider to ensure that, in the event of its insolvency, LCH.C Ltd would continue to hold underlying source code.
- *Financial messaging provider.* LCH.C Ltd, its clearing participants and clearing participants' settlement banks use messaging infrastructure provided by a third-party vendor. LCH.C Ltd maintains a framework of operational risk controls relating to this provider, consisting of a number of specific requirements to be met in order to mitigate the impact of a failure of this provider's infrastructure.
- *IT support and data processing provider.* LCH.C Ltd outsources some information technology support and data processing services to a third party supplier. Under the arrangement, the supplier provides information technology production services (to enable LCH.C Ltd to offer 24 hour coverage), information technology support and information technology development resources, including testing. LCH.C Ltd considers this provider to be a critical service provider, and has crisis management arrangements in place with regard to this entity (see CCP Standard 16.9).
- *Utility providers.* Operational risks posed by utility providers are managed in the context of business continuity (see CCP Standard 16.7). LCH.C Ltd's head office is supplied by multiple external electricity feeds, and has an uninterruptible power supply for critical business areas. Telecommunications services are provided without a single point of failure from LCH.C Ltd's telecommunication provider into LCH.C Ltd's data centres, and from LCH.C Ltd's data centres to LCH.C Ltd's systems.

As noted above, LSEG has also announced that it intends to launch a SSC. Once live, it is expected that LCH.C Ltd will also rely on technology and shared support services provided by the LSEG SSC.

Operational support to Australian clearing participants

The operating hours of the SwapClear service (currently from 6.00 am to 12.00 am UK time/3.00 pm to 9.00 am AEST) are such that 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. Currently, trades registered in the early morning in Australia are eligible to be cleared immediately if the SwapClear system is open. For example, a trade registered for

⁸⁶ Available at <<http://www.bis.org/cpmi/publ/d123.htm>>.

clearing early on 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 the UK.

This leaves Australian banks and their counterparties with temporary bilateral credit risk exposures, which have to be managed via bilateral arrangements and result in greater operational complexity and uncertainty. Upon licensing of the SwapClear service in Australia, the Bank set a regulatory priority that LCH.C Ltd extend its operating hours and provide appropriate operational support to participants in the Australian time zone. In its 2013/14 Assessment of the SwapClear service, the Bank stated that it expected LCH.C Ltd to continue its work on this priority.

LCH.C Ltd extended the opening time of the SwapClear service in late 2014 from 7.30 am to 5.00 am UK time (4:30 pm to 2.00 pm AEST). However, following several operational incidents that resulted in the late opening of the service, the opening time was wound back to 6.00 am UK time (3.00 pm AEST). LCH.C Ltd is considering options to further extend SwapClear's operating hours. The Bank expects LCH.C Ltd to continue its work to extend the operating hours of the SwapClear service, while ensuring the safety and resilience of its operations.

Australian participants can seek operational support from LCH.C Ltd's Sydney-based staff or via LCH.C Ltd staff in London or New York. LCH.C Ltd now has a total of 14 staff in its Sydney office, covering regulatory compliance, operations, operational support, risk management and sales functions.

16.6 A participant of a central counterparty should have complementary operational and business continuity arrangements that are appropriate to the nature and size of the business undertaken by that participant. The central counterparty's rules and procedures should clearly specify operational requirements for participants.

LCH.C Ltd's participation requirements seek to ensure that clearing participants have facilities, procedures and personnel that are adequate to meet the operational requirements of SwapClear (see CCP Standard 17). A clearing participant's systems and equipment must be able to support a high volume of eligible SwapClear transactions, and its back office infrastructure must be remote from the trading floor. A clearing participant's staff must have a high standard of integrity and sufficient knowledge of the nature, risks and obligations of trading in the markets and contracts cleared by the SwapClear service. At least two staff must be fully conversant in LCH.C Ltd's clearing procedures. A prospective clearing participant must undertake connectivity testing prior to being admitted to the SwapClear service, and LCH.C Ltd also provides testing material to participants to facilitate their own testing prior to admittance.

Clearing participants must maintain up-to-date risk management procedures that address the risks they may pose to LCH.C Ltd. This should cover, among other things, a clearing participant's liquidity management and settlement procedures, and should include contingency arrangements to ensure that a clearing participant could continue to meet its margin obligations to LCH.C Ltd in the event of a failure of its nominated PPS bank(s). LCH.C Ltd requests information from prospective clearing participants regarding the disaster recovery arrangements that support their planned clearing business, but does not mandate specific business continuity requirements for clearing participants. The LCH.C Ltd Rulebook and Procedures require that all SwapClear clearing participants take part in periodical LCH.C Ltd and LCH.C Group BCM testing (see CCP Standard 16.8).

Business continuity arrangements

16.7 A central counterparty should have a business continuity plan that addresses events posing a significant risk of disrupting operations, including events that could cause a wide-scale or major disruption. The plan should incorporate the use of a secondary site and should be designed to ensure that critical information technology systems can resume operations within two hours following disruptive events. Business continuity arrangements should provide appropriate redundancy of critical systems and appropriate mitigants for data loss. The business continuity plan should be designed to enable the central counterparty to facilitate settlement by the end of the day of the disruption, even in case of extreme circumstances. The central counterparty should regularly test these arrangements.

Business continuity management

LCH.C Ltd's approach to business continuity is defined in the LCH.C Group BCM Policy. This policy describes the LCH.C Group business continuity model that all LCH.C Group CCPs are required to follow, including requirements for threat assessment and monitoring, and the key roles and responsibilities in relation to BCM. BCM is managed centrally within LCH.C Group by the BCM Team, which coordinates all BCM policies and efforts across the LCH.C Group CCPs and acts in an advisory and training capacity on BCM for each CCP. The BCM Team is accountable to the LCH.C Ltd COS.

The LCH.C Group BCM Policy and all supporting documents 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 review of the BCM Policy is carried out by the LCH.C Group BCM Team, and changes to the policy require the approval of the LCH.C Group Audit Committee and Board.

The LCH.C Group BCM Policy is supported by the LCH.C Group Major Incident Management Process and LCH.C Group CMT Plan (see 'Incident management'), and the LCH.C Ltd IT Disaster Recovery Plan, which detail procedures for ensuring continuity of service in a crisis. The IT Disaster Recovery Plan covers production services provided by LCH.C Ltd to LCH.C SA and LCH.C LLC, and services provided to LCH.C Ltd by its IT support and data processing provider (see CCP Standards 16.5 and 16.9).

The LCH.C Ltd IT Disaster Recovery Plan defines LCH.C Ltd's BCPs in relation to LCH.C Ltd's IT infrastructure, and would generally be invoked in conjunction with the Group Major Incident Management Process. The IT Disaster Recovery Plan also covers business continuity with respect to cyber risk; the Bank will expect LCH.C Ltd to review these arrangements in light of CPMI-IOSCO guidance on cyber resilience. The IT Disaster Recovery Plan is designed to ensure that under major eventualities LCH.C Ltd's critical services could be recovered quickly from the point at which they were interrupted, for instance due to IT infrastructure or service failures and events disrupting LCH.C Ltd's physical infrastructure. Specifically, the objectives of this plan are: recovery of all clearing services, including SwapClear, within two hours of the point of failure; the ability to perform end-of-day settlement of transactions on the same business day; and complete recovery of data should critical information technology systems fail. Changes to the IT Disaster Recovery Plan require the approval of the LCH.C Ltd Audit Committee and LCH.C Ltd Board.

LCH.C Ltd's IT disaster recovery objectives are supported by the maintenance of geographically separate data centres. The data centres use a combination of synchronous data replication (data are posted to the sites at the same time so that data remain current at the sites) and asynchronous data replication (data are posted with a minor delay which necessitates reconciliation before production services could be run). All of LCH.C Ltd's data centres have the same capacities, and are permanently

staffed. LCH.C Ltd conducts fail-over testing of its production environment between its data centres (see below). Many services within each of LCH.C Ltd's data centres have resilience which would avoid fail-over between data centres for single component failures.

LCH.C Ltd's disaster recovery objectives are also supported by the maintenance of office-specific BCPs that set out tailored recovery scenarios and procedures. Potential scenarios which may require the transfer of work area responsibilities are documented in the LCH.C Group Threat Assessment. This document sets out the process by which LCH.C Group CCPs identify and document threats to business activities, mitigation strategies to address these threats, and reporting requirements for each CCP (including LCH.C Ltd). The Threat Assessment is updated annually by the BCM Team, and is reviewed and approved by the LCH.C Ltd Audit Committee and Board.

LCH.C Ltd has established a BCP for its Australian operations. The Australian BCP sets out recovery strategies for IT disasters, operational incidents and physical damage or denial of access to LCH.C Ltd's premises in Australia, as well as communication arrangements tailored to LCH.C Ltd's Australian operations. The Australian BCP is reviewed and updated on a quarterly basis, or as and when organisational or personnel changes occur. LCH.C Ltd conducted a BCP exercise for its Sydney office in July 2015 to test its ability to respond to a localised business continuity event. The Australia Country Head maintains the Australian BCP.

LCH.C Ltd is required to notify the Bank of any material incidents relating to business continuity and operational risk. In addition, the Australian BCP contains explicit provisions for communication arrangements between the Bank and staff in LCH.C Ltd's Australian operations. The LCH.C Group also maintains a BCM Regulatory Reporting and Notification Requirements document, which details the procedures for external communication with regulators (including the Bank), emergency services, the market, industry and media.

LCH.C Group and LCH.C Ltd carry out regular tests of business continuity and disaster recovery arrangements, including: regular fail-over testing between its data centres (involving clearing participants and external service providers); work area recovery site testing; remote access testing; crisis management testing; and internal staff crisis notification testing.

Fail-over testing between LCH.C Ltd's data centres is conducted on at least an annual basis, to ensure that LCH.C Ltd could recover the SwapClear service within a period of two hours. LCH.C Ltd conducted several fail-over tests between its data centres during the Assessment period, consisting of tests between its synchronous data centres as well as between its synchronous and asynchronous data centres. Enhancements were made during the period to ensure that the two-hour recovery time objective could be met in testing for all relevant systems and checks. Failover tests were conducted between LCH.C Ltd's synchronous data centres in August 2014 and February 2015; both tests were successful.

LCH.C Ltd currently has in place a number of work area recovery sites; these are tested for connectivity on a weekly basis. Complete work area recovery exercises are conducted quarterly. Staff members also have remote access (which is tested on a quarterly basis) to LCH.C Ltd's IT systems. LCH.C Ltd also undertakes an annual disaster recovery exercise which involves all clearing participants and critical service providers. All LCH.C Group staff are required to undertake BCM awareness training on an annual basis.

Incident management

LCH.C Ltd has developed an Incident Management Process which documents the procedures, roles and responsibilities for recording, reporting, and resolving operational and IT (including cyber)

incidents. The Incident Management Process categorises incidents according to one of five levels of severity, and sets out how each category of incident should be resolved. LCH.C Ltd made enhancements to its incident management process during the 2014/15 period to clarify the appropriate categorisation of incidents; incidents are categorised based on their impact on LCH.C Group's CCPs' ability to meet their financial, legal or regulatory obligations, or the availability of critical business services to participants or partners.

All IT incidents are initially handled by the LCH.C Ltd Incident Handling Team. Specific notification and escalation requirements are set out for each category of incident, including invocation of the Major Incident Management Process and CMT Plans for incidents in the two highest severity categories. The LCH.C Ltd IT Disaster Recovery Plan would also be invoked for particular types of incidents (discussed above). Post-incident reviews are mandatory for all incidents in the three highest severity categories.

The LCH.C Group Major Incident Management Process would be invoked in the event of high severity incidents. The LCH.C Group Major Incident Management Process specifies procedures to invoke BCPs and to coordinate and resolve major incidents across all LCH.C Group CCPs. In the event that an incident was prolonged, escalated or could threaten the immediate safety of LCH.C Group staff or operations, the LCH.C Group CMT Plan would be invoked. The LCH.C Group CMT Plan aims to ensure that the response to, and management of, a crisis within LCH.C Group or one of the LCH.C Group CCPs would be coordinated and effective, to minimise the impact on staff and clearing participants. CMTs have been established for the LCH.C Group and each of its CCPs. Membership of the LCH.C Ltd CMT comprises representatives from all critical LCH.C Ltd departments, including the LCH.C Ltd CEO and the Heads of the clearing services (including SwapClear). In the event of an LCH.C Group-wide crisis, the LCH.C Group CMT would be responsible for coordinating and managing the crisis response. The CMT plan specifies the LCH.C Ltd CMT's responsibilities in the event of an LCH.C Ltd-specific crisis, and provides for the escalation of crisis management to the Group CMT. The CMT Plan is tested and reviewed on a quarterly basis; the LCH.C Ltd CMT undertakes quarterly scenario-based exercises of possible threats, including one group-wide exercise that involves the LCH.C Group CMT. Changes to the Incident Management Process are approved by the IT Production Management team and changes to the CMT Plan must be approved by staff with specified Crisis Management responsibilities, consisting of the Group CEO, Group CTO and the LCH.C Ltd Head of Operational Risk. Changes to the Materiality Matrix that would impact the Incident Management process must be approved by the LCH.C Ltd ERCo and the LCH.C Ltd Risk Committee.

16.8 A central counterparty should consider making contingency testing compulsory for the largest participants to ensure they are operationally reliable and have in place tested contingency arrangements to deal with a range of operational stress scenarios that may include impaired access to the central counterparty.

As noted under CCP Standard 16.6, clearing participants must maintain up-to-date risk management procedures that address the risks they may pose to LCH.C Ltd.

The LCH.C Ltd Rulebook and Procedures require that all clearing participants, including those participating in the SwapClear service, take part in periodic LCH.C Ltd and LCH.C Group BCM testing. As noted under CCP Standards 16.6 and 16.7, LCH.C Ltd undertakes an annual disaster recovery exercise that involves all clearing participants and critical service providers. As part of this exercise, members are asked to test their connectivity to any LCH.C Ltd asynchronous data centre following successful failover, within a window of around two hours. As discussed in CCP Standard 16.6, LCH.C Ltd does not mandate specific business continuity requirements for clearing participants, although does review the disaster recovery arrangements that prospective participants have in place for their own operations as part of its due diligence during the on-boarding process.

Outsourcing and other dependencies

16.9 A central counterparty that relies upon, outsources some of its operations to, or has other dependencies with a related body, another FMI or a third-party service provider (for example, data processing and information systems management) should ensure that those operations meet the resilience, security and operational performance requirements of these CCP Standards and equivalent requirements of any other jurisdictions in which it operates.

A number of LCH.C Group policies and procedures support LCH.C Ltd's scrutiny of critical service providers with respect to operational risks to its services, confidentiality and integrity of information and business continuity arrangements. These include the LCH.C Group Outsourcing Policy, Procurement Policy, and Vendor Management Process (see CCP Standard 16.5), the LCH.C Group Information Security Policy (see CCP Standard 16.3) and the LCH.C Group BCM Policy (see CCP Standard 16.7). LCH.C Ltd has informed the Bank that, in designing these policies, LCH.C Group had regard to the *CPMI-IOSCO Assessment Methodology for Oversight Expectations Applicable to Critical Service Providers*.

All LCH.C Group critical service providers are required to implement business continuity arrangements equivalent to those of LCH.C Group, and are required to carry out testing of these arrangements periodically.

LCH.C Ltd considers its IT support and data processing provider to be a critical service provider (see CCP Standard 16.5). The staff of this external provider who provide support services to LCH.C Ltd from the provider's site are trained by LCH.C Ltd. Management, control, responsibility and accountability for the operation of the service lie with LCH.C Ltd. LCH.C Ltd's arrangements with the provider ensure that LCH.C Ltd and its regulators have access to the provider's facilities, personnel and records.

LCH.C Ltd's arrangements with its IT support provider are addressed in the IT Disaster Recovery Plan. The provider has an alternative site that could be used if its primary site was affected. LCH.C Ltd and the provider have also established a contingency strategy for critical services to be provided from London if necessary. Tests of backup arrangements are undertaken annually and the results reported to LCH.C Ltd. As noted in CCP Standard 16.7, LCH.C Ltd also undertakes an annual disaster recovery exercise which involves all clearing participants and critical service providers. The staff of the external service provider also participate in testing during fail-over and work area recovery exercises, as these staff support these processes.

16.10 All of a central counterparty's outsourcing or critical service provision arrangements should provide rights of access to the Reserve Bank to obtain sufficient information regarding the service provider's operation of any critical functions provided. A central counterparty should consult with the Reserve Bank prior to entering into an outsourcing or service provision arrangement for critical functions.

The LCH.C Group Outsourcing Policy specifies that all arrangements with external service providers, irrespective of the critical importance of these arrangements, must provide appropriate access rights, including on-site access, for the regulators of LCH.C Group CCPs. LCH.C Ltd's arrangement with its IT support and data processing provider is intended to ensure that LCH.C Ltd and its regulators have access to the provider's facilities, personnel and records. Since LCH.C Ltd is a UK-based CS facility, any actions in this regard would be led by LCH.C Ltd's primary regulator, the BoE (see CCP Standard 16.11).

New arrangements with external service providers, for activities linked to the management of risks in relation to LCH.C Ltd's clearing business, require the approval of the BoE, the LCH.C Group Compliance department and the LCH.C Ltd Board. LCH.C Ltd is required to notify the Bank of material changes to its operational processes and arrangements, including any co-sourcing or outsourcing arrangements.

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.

As discussed in CCP Standard 3.5, any crisis management actions with regards to LCH.C Ltd would be led by the BoE in its role as LCH.C Ltd's primary regulator and/or in its role as the UK resolution authority. Clarification as to how a resolution scenario would work in practice, including with regard to LCH.C Ltd's critical service providers, is expected to develop in light of pending EU legislation relating to CCP recovery and resolution.

LCH.C Ltd has notification requirements with the BoE and the Bank when BCPs or procedures are activated. LCH.C Ltd is also subjected to event-specific reporting requirements in relation to certain operational incidents.

LCH.C Ltd's arrangements with LCH.C LLC and LCH.C SA include requirements to ensure ongoing service provision in the event that one of these CCPs entered into resolution (see CCP Standard 16.4).

Standard 17: Access and participation requirements

A central counterparty should have objective, risk-based and publicly disclosed criteria for participation, which permit fair and open access.

LCH.C Ltd has objective and transparent participation requirements set out in its Rulebook (CCP Standard 17.1). These requirements are tailored to the risks the CCP faces, and are designed to ensure that clearing participants are of suitable financial standing and have sufficient operational capabilities to conduct business (CCP Standard 17.2). LCH.C Ltd monitors clearing participants' compliance with its participation requirements on a regular basis, and has the authority to suspend or terminate participation or take other disciplinary or remedial action in the event of a breach of these requirements (CCP Standard 17.3).

17.1 A central counterparty should allow for fair and open access to its services, including by direct and, where relevant, indirect participants and other FMIs, based on reasonable risk-related participation requirements.

LCH.C Ltd's participation requirements for the SwapClear service are transparent, objective, and are applied equally across existing clearing participants and clearing participant applicants.⁸⁷ All participation requirements are publicly disclosed in the LCH.C Ltd Rulebook, which is available on the LCH.C Group website.⁸⁸ The LCH.C Group and SwapClear websites contain dedicated pages outlining

87 SwapClear clearing participants must apply for separate memberships for each of the LCH.C Ltd services that they participate in.

88 Available at <<http://www.lchclearnet.com/documents/731485/762691/procedures+section+1+-+18.12.14.pdf>>.

the participation requirements, application costs and the procedure for a Clearing Member Status application.

Financial participation requirements imposed by LCH.C Ltd ensure that clearing participants have adequate financial resources to withstand unexpected losses. SwapClear participants are subject to minimum capital requirements and must be appropriately regulated (see CCP Regulation 17.2).

Operational requirements seek to ensure that clearing participants are able to effect the settlement of their obligations with LCH.C Ltd (see CCP Standard 9.1), to engage in the DMP (see CCP Standard 12.1) and to monitor the risks they pose to LCH.C Ltd (see CCP Standard 16.6). Legal requirements provide for a high degree of legal certainty with respect to the material aspects of LCH.C Ltd's activities, and ensure that LCH.C Ltd's clearing participants are well regulated (see CCP Standard 1.3).

The LCH.C Ltd CRMC is responsible for reviewing and recommending or rejecting prospective clearing participants. The LCH.C Ltd ERCo has the ultimate discretion to approve or reject the application of a new clearing participant, and is notified of decisions taken by the LCH.C Ltd CRMC. Where the LCH.C Ltd CRMC refuses an application, the applicant may appeal to the LCH.C Ltd ERCo. In accordance with the LCH.C Ltd Rulebook, LCH.C Ltd retains the discretion to refuse an application for membership. In the event that LCH.C Ltd refuses an application, clear reasons for the rejection must be provided to the applicant in writing. A prospective clearing participant may appeal against a decision to decline to grant Clearing Member Status, in accordance with the appeal procedures set out in the LCH.C Ltd Rulebook.

17.2 A central counterparty's participation requirements should be justified in terms of the safety of the central counterparty and the markets it serves, be tailored to and commensurate with the central counterparty's specific risks, and be publicly disclosed. Subject to maintaining acceptable risk control standards, a central counterparty should endeavour to set requirements that have the least restrictive impact on access that circumstances permit.

Overview of participation

LCH.C Ltd assigns each SwapClear clearing participant a particular category of clearing membership status, depending on the type of clearing membership sought:⁸⁹

- *SwapClear Clearing Member Status*, which enables a clearing participant to clear any of the products eligible for clearing through the SwapClear service. Clearing participants with Clearing Member Status can clear proprietary business and, with the prior approval of LCH.C Ltd, non-US domiciled client business.
- *Futures Commission Merchant Clearing Member Status*, which enables a clearing participant that is an FCM to clear any of the products eligible for clearing through the SwapClear service. Clearing participants with FCM Clearing Member Status can clear proprietary business and, with

⁸⁹ LCH.C Ltd also maintains a SwapClear Dealer Status membership category, which enables a dealer in the product categories eligible for clearing through the SwapClear service to clear transactions on behalf of existing SwapClear clearing participants. Clearing participants remain responsible for all aspects of a contract that is registered in SwapClear by a dealer on their behalf.

the prior approval of LCH.C Ltd, US domiciled client business and non-US domiciled client business.⁹⁰

- *Special Clearing Member Status*, which would apply to a CCP with which LCH.C Ltd has an interoperable link. There are currently no interoperable links between the SwapClear service and other CCPs.

Participation requirements

LCH.C Ltd's participation requirements for the SwapClear service are tailored to the specific activities of SwapClear, and include minimum capital and other financial requirements, operational requirements and legal requirements. All SwapClear clearing participants must meet these participation requirements, and LCH.C Ltd has the right to impose additional requirements on clearing participants.⁹¹ A SwapClear clearing participant must also satisfy all participation requirements specific to each of the other LCH.C Ltd-operated clearing services that it participates in.

Financial requirements include minimum net capital requirements and default fund contributions (see CCP Standard 4.4). SwapClear clearing participants must hold at least US\$50 million in net capital.⁹² Prior to admitting a clearing participant to the SwapClear service, LCH.C Ltd must be satisfied that the prospective clearing participant (or a clearing participant's related entity in the same corporate group) is also subject to prudential or securities regulation in their home jurisdiction that is at least as stringent as that applicable to credit institutions and investment firms within the EU. Before admitting a non-UK clearing participant, LCH.C Ltd obtains an independent legal opinion to ensure that the SwapClear Rulebook is enforceable in the clearing participant's home jurisdiction (see CCP Standard 1.6).

Operational participation requirements include the maintenance of adequate risk management arrangements, technical infrastructure and operational capacity (see CCP Standard 16). Clearing participants must open accounts with eligible PPS banks in each currency in which they incur settlements, to pay and receive cash obligations to and from LCH.C Ltd (see CCP Standard 9.1). Prospective clearing participants must participate in a driving test prior to being admitted to SwapClear, and all clearing participants must participate in SwapClear fire drills, which are held twice a year (see CCP Standard 12.1).

To address the balance between open access and the risk individual clearing participants bring to the CCP, the LCH.C Ltd Credit Risk Team monitors SwapClear clearing participants' exposures and key credit risk indicators (see CCP Standards 4.1 and 17.3). Risk management controls such as concentration limits and additional margin may be applied based on a clearing participant's ICS and a range of other financial indicators (see CCP Standard 17.3).

90 Clients domiciled in the US are required to clear through entities registered with the CFTC as FCMs. A FCM is an entity certified by the CFTC that is permitted to solicit or accept orders for the purchase or sale of OTC and exchange-traded derivatives, and that accepts payment from, or extends credit to, those whose orders are accepted.

91 SwapClear clearing participants with Clearing Member Status, FCM Clearing Member Status or Special Clearing Member Status are subject to the same participation requirements.

92 For the purposes of LCH.C Ltd's participation requirements, net capital is defined as the sum of permanent capital and additional capital. Permanent capital is defined as fully paid-up shares, fully paid-up preference shares, the share premium account and other reserves not available for distribution. Additional capital is defined as other equity reserves, redeemable shares and subordinated loans from a clearing participant's parent company.

Client clearing

Client clearing in SwapClear is possible via SwapClear's client clearing service. In order to offer client clearing, a clearing participant must apply to LCH.C Ltd's Onboarding department, either as part of its initial application or as an extension of its activities. When considering applications for client clearing, LCH.C Ltd takes into account a clearing participant's proposed criteria and arrangements for the provision of client clearing services, and the potential concentration of risks arising from the provision of client clearing services (see CCP Standard 18). Before authorising a non-UK clearing participant to offer client clearing, LCH.C Ltd obtains an independent legal opinion to gain comfort that SwapClear's client clearing arrangements will be enforceable in the clearing participant's jurisdiction (see CCP Standard 13.2).

LCH.C Ltd imposes no restrictions on eligibility of clients; this is at the discretion of the relevant clearing participant. Specific rules and regulations relating to the provision of client clearing are set out in the LCH.C Ltd Rulebook (see CCP Standard 13.1).

17.3 A central counterparty should monitor compliance with its participation requirements on an ongoing basis and have clearly defined and publicly disclosed procedures for facilitating the suspension and orderly exit of a participant that breaches, or no longer meets, the participation requirements.

Monitoring compliance

As part of the Clearing Membership Agreement between a clearing participant and LCH.C Ltd, a clearing participant must notify LCH.C Ltd immediately if it:

- no longer meets any of LCH.C Ltd's participation requirements
- has insolvency, or similar proceedings, brought against it
- is granted, refused or has revoked a license or authorisation to carry on investment, banking or insurance business in any country
- is being investigated by a statutory body or other regulatory authority, has disciplinary measures imposed on it, or is convicted of any offence in relation to its investment, banking or insurance businesses in any country.

In the event that a clearing participant notified LCH.C Ltd of any changes relating to the list above, the LCH.C Ltd Credit Risk Team would assess the impact on the participant's ability to meet LCH.C Ltd's participation requirements and the risk the clearing participant presents to the SwapClear service. Recommended remedial action would be put forward to Senior Risk Management and the LCH.C Ltd CRMC for approval or escalation to the LCH.C Ltd ERCo where required.

In addition to imposing notification requirements on clearing participants, LCH.C Ltd carries out regular monitoring of clearing participants' compliance with the participation requirements. The LCH.C Ltd Credit Risk Team assigns an ICS to each clearing participant, and their credit quality is monitored on an ongoing basis when relevant information becomes available (see CCP Standard 4.2). Clearing participants are also required to provide their audited financial reports to LCH.C Ltd.

The LCH.C Group Counterparty Credit Risk Policy states that each clearing participant's compliance with all participation requirements is reviewed by the CRMC at least annually, and clearing participants with a higher ICS are subject to more frequent reviews. The deterioration of a clearing participant's ICS would trigger an ad hoc review of the participant's compliance with the participation

requirements, in accordance with LCH.C Ltd's internal Credit Assessment Policy (see CCP Standard 4.2).

Suspension and exit of a clearing participant

The LCH.C Ltd Rulebook allows LCH.C Ltd to impose conditions if there is an indication that a clearing participant may no longer meet the participation requirements, over and above LCH.C Ltd carrying out more detailed monitoring and increasing margin requirements. These conditions include: requiring prior authorisation for trades above a specified size; position reduction; position transfer to other participants; and trading for liquidation only.

In the event that a clearing participant is in breach of the participation requirements, decisions to impose additional conditions on the participant are taken by the LCH.C Ltd CRMC and the LCH.C Ltd ERCo is notified. In accordance with the LCH.C Ltd Rulebook, if a clearing participant is in breach of the participation requirements but has not defaulted on payments to LCH.C Ltd, a grace period of 30 days (or longer as LCH.C Ltd sees fit) may be allowed for a clearing participant to remedy the breach.

If no other actions are feasible or deemed sufficient to reduce the risk a clearing participant brings to LCH.C Ltd, the LCH.C Ltd CRMC can recommend to the LCH.C Ltd ERCo that a clearing participant is suspended or its SwapClear membership terminated. Such actions would be taken in accordance with the Termination of Clearing Member Status procedures set out in the LCH.C Ltd Rulebook. Under the default rules, the LCH.C Ltd CEO has the discretion to declare a member in default as soon as it believes a participation requirement is breached. Once a default notice has been issued, withdrawal of a clearing participant occurs in accordance with the Default Procedures (see CCP Standard 12.1).

The LCH.C Ltd Rulebook contains procedures for a clearing participant to appeal against a decision to suspend or terminate its Clearing Member Status, in the event that the participant is not in default and such a decision occurs independently of the operation of the Default Rules and Procedures.

In the case of a voluntary withdrawal by a clearing participant, notice of at least 90 days is required. A clearing participant must terminate all open contracts registered with LCH.C Ltd within this 90-day period. If after 90 days the portfolio has not been closed out, LCH.C Ltd may liquidate the portfolio or require a clearing participant to remain in the SwapClear service until there are no remaining contracts.

Standard 18: Tiered participation arrangements

A central counterparty should identify, monitor and manage the material risks to the central counterparty arising from tiered participation arrangements.

LCH.C Ltd's rules, procedures and agreements with clearing participants allow it to gather basic information about clearing participant's direct clients and indirect clients, in order to identify and monitor material risks arising from tiered participation arrangements (CCP Standards 18.1, 18.2). LCH.C Ltd collects information about tiered participation through direct participants and its own systems, which allow it to identify clearing participants' clients who comprise a significant portion of a clearing participant's or total CCP activity (CCP Standard 18.3). LCH.C Ltd regularly monitors and manages any material risks arising from tiered participation arrangements (CCP Standard 18.4).

LCH.C Ltd began to implement client clearing in Australian in November 2015. LCH.C Ltd is encouraged to continue its dialogue with the Bank on its broader client clearing arrangements, including its approach to monitoring risks from tiered participation.

18.1 A central counterparty should ensure that its rules, procedures and agreements allow it to gather basic information about indirect participation in order to identify, monitor and manage any material risks to the central counterparty arising from such tiered participation arrangements.

LCH.C Ltd has in place rules, procedures and agreements with clearing participants (direct participants) that allow it to gather basic information about clearing participants' direct clients and indirect clients (for the purposes of CCP Standard 18, the term 'indirect participants' will be used to refer to both direct clients and indirect clients). LCH.C Ltd can collect information about tiered participation through direct participants and by using its own systems. The LCH.C Ltd Rulebook also specifies that the CCP may request additional information from clearing participants regarding their client clearing services.

The SCCS primarily operates using a principal-to-principal model of clearing participation. Direct participants must be authorised by LCH.C Ltd's Onboarding department before allowing indirect participation through SwapClear's client clearing arrangements. Direct clients enter into principal-to-principal relationships with their clearing participant(s). LCH.C Ltd has no principal relationships with, or direct credit exposures to, any indirect participants, other than when porting occurs after the default of a clearing participant. LCH.C Ltd has informed the Bank that it therefore considers one of the key risks associated with tiered participation to be effecting porting in the default of a direct participant (see CCP Standard 13). LCH.C Ltd also faces indirect risks arising from material dependencies between large indirect participants and direct participants, which are primarily managed through the monitoring of direct participant positions (see CCP Standard 18.3).

To access the SCCS, LCH.C Ltd requires direct clients to submit a range of documents to the clearing participant during the on-boarding process. Key information must be then sent by the clearing participant to LCH.C Ltd. This includes:

- the name of the client (SwapClear Client identifier)
- client contact details (including the details of at least two individuals to contact in the case of default of the direct participant)
- the client account type (ISA or OSA)
- the client account used within SCCS to clear trades (SwapClear Client account identifier)
- the contact details of the client's nominated backup clearing participant(s).

LCH.C Ltd has informed the Bank that it asks clearing participants for an annual update of client information and requires clearing participants to immediately contact the LCH.C Ltd Onboarding department if client contact details change. LCH.C Ltd is currently conducting a review of its process for updating client information.

LCH.C Ltd's principal-to-principal model of tiered participation means that it only faces credit exposures to direct participants (i.e. its key concern is the ability of each direct participant to meet its obligations across all its accounts). In monitoring its exposures, LCH.C Ltd therefore focuses on its total exposure to each direct participant. Indirect participant exposures are not routinely monitored separately; rather they are identified in the daily account-level monitoring of LCH.C Ltd's total exposure to each direct participant. LCH.C Ltd produces daily reports that monitor positions and associated cash flows across all of a direct participant's accounts. Using this information, the SwapClear and Group-level risk management teams can determine the relative shares of house and client activity, allowing them to monitor any material risks to the CCP arising from indirect participant

exposures. To manage any material risks that may arise from such exposures, LCH.C Ltd can impose activity restrictions or additional controls, including calls for additional margin (see CCP Standard 4.3).

Although the focus of its routine monitoring is on its total exposure to each direct participant, LCH.C Ltd also conducts some monitoring of exposures to individual indirect participants. Specifically, LCH.C Ltd identifies the largest individual indirect participants in a service and monitors their total exposures across each direct participant they use to access the SCCS.⁹³

LCH.C Ltd is encouraged to continue its dialogue with the Bank on its broader client clearing arrangements, including its approach to monitoring risks from tiered participation.

18.2 A central counterparty should identify material dependencies between direct and indirect participants that might affect the central counterparty.

As noted in CCP Standard 18.1, LCH.C Ltd collects information about tiered participation arrangements using its own systems and from information provided by direct participants. As discussed in CCP Standard 13.2, information collected during the on-boarding process allows LCH.C Ltd to identify its direct clients (although LCH.C Ltd will not always be able to identify indirect clients). This allows LCH.C Ltd to assess the degree to which indirect participants may rely on their direct participant and any risks that may arise from such dependencies.

Using its own systems, LCH.C Ltd can also determine the size of direct and indirect participant positions. As discussed in CCP Standard 18.1, LCH.C Ltd can identify and monitor the proportion of direct participant activity attributable to a particular indirect participant. This allows LCH.C Ltd to assess the degree to which a direct participant may rely on its indirect participants.

Based on this information, LCH.C Ltd has not identified any material dependencies between direct and indirect participants to date.

18.3 A central counterparty should identify indirect participants responsible for a significant proportion of transactions processed by the central counterparty and indirect participants whose transaction volumes or values are large relative to the capacity of the direct participants through which they access the central counterparty in order to manage the risks arising from these transactions.

As discussed in CCP Standard 18.1 and CCP Standard 18.2, LCH.C Ltd is able to identify and monitor the positions of its indirect participants. Should the monitoring of client accounts give rise to concerns about the size of positions in a clearing participant's client account, LCH.C Ltd can conduct more detailed monitoring.

LCH.C Ltd has informed the Bank that it can monitor the proportion of indirect participant activity relative to the capacity of its direct participant, in order to evaluate a direct participant's exposure to a specific indirect participant. As discussed in CCP Standard 18.1, LCH.C Ltd also has processes in place to monitor an indirect participant's total exposure (based on its margin requirements) across all direct participants in order to identify indirect participants that account for a significant proportion of total positions held at the CCP. LCH.C Ltd also mitigates indirect participant exposures by requiring direct participants to call margin from their clients at least at the level called from the direct participant by LCH.C Ltd.

93 LCH.C Ltd has informed the Bank that it currently has no indirect clients.

Although LCH.C Ltd has no direct credit exposure to indirect participants in the principal-to-principal model, an indirect participant may present a material risk to LCH.C Ltd if it disrupts or materially or adversely affects its direct clearing participant (e.g. due to its own default). As discussed in CCP Standard 18.1, to mitigate such risks LCH.C Ltd's focus is to ensure that a direct participant can meet its obligations (including those arising from any indirect participants it provides services to). In the event that LCH.C Ltd had concerns regarding the total level of a direct participant's exposures, it could: engage in discussions with the clearing participant; increase the clearing participant's net capital requirements; tighten credit-risk-related-limits or apply higher margin requirements (see CCP Standard 4.3). The application of additional margin requirements is reviewed by LCH.C Ltd on a case-by-case basis and also takes into account a direct participant's porting arrangements. LCH.C Ltd has portability arrangements in place to mitigate the risks arising from a clearing participant default (see CCP Standard 13.3).

Although LCH.C Ltd does not actively encourage direct participation in situations where indirect participants account for a material proportion of the transactions processed by a CCP, LCH.C Ltd is receptive to increasing the number of SwapClear direct participants, assuming participation requirements can be met (see CCP Standard 17).

As per CCP Standard 17.2, LCH.C Ltd imposes no restrictions on the eligibility of indirect participants, which is instead left at the discretion of the direct participant.

18.4 A central counterparty should regularly review risks arising from tiered participation arrangements and should take mitigating action when appropriate.

As discussed in CCP Standard 18.1 and CCP Standard 18.3, LCH.C Ltd monitors and manages tiering participation risks as part of its daily monitoring of direct participation exposures. LCH.C Ltd primarily seeks to manage concerns regarding tiered exposures by imposing additional margin requirements. LCH.C Ltd has formal initial margin and margin add-on standards, which set out how the CCP monitors and manages, on a daily basis, the credit and liquidity exposures that arise from tiered participation arrangements. Concentration/liquidity risk and counterparty credit risk, arising from both direct and indirect participant activity, are specifically addressed in the Margin Add-On Standard. These standards are set out in the Group Financial Resource Adequacy Policy, supplemented by the Group Counterparty Credit Risk Policy, and reviewed at least annually. LCH.C Ltd also has the capacity to investigate further when concerns are raised around direct and indirect participant positions (see CCP Standard 18.1 and CCP Standard 18.3).

In the event of a direct participant default, LCH.C Ltd's management of porting of indirect participant positions and collateral, and any potential credit exposures to an indirect participant, is governed by the Group Default Management Policy (see CCP Standard 12 and CCP Standard 13). This policy is reviewed at least annually.

To mitigate legal or operational risks that could arise in a default scenario, LCH.C Ltd obtains an independent legal opinion to gain comfort regarding the enforceability of SwapClear's client clearing arrangements in the direct participant's jurisdiction. This is conducted prior to allowing non-UK direct participants to offer client clearing.

Standard 19: FMI links

A central counterparty that establishes a link with one or more FMIs should identify, monitor and manage link-related risks.

LCH.C Ltd maintains links to multiple CSDs/SSFs and trade repositories (TRs) in relation to its SwapClear service.⁹⁴ LCH.C Ltd identifies, monitors and manages operational and financial risks related to its link arrangements in line with its internal policies and procedures (CCP Standard 19.1). LCH.C Ltd's links with CSDs are governed by contractual agreements (CCP Standard 19.2). During the Assessment period LCH.C Ltd entered into a link arrangement with Austraclear, an Australian CSD and SSF. This arrangement supports LCH.C Ltd's use of its ESA and its management of its AUD liquidity needs; LCH.C Ltd consulted with the Bank during the establishment of this link (CCP Standard 19.3). LCH.C Ltd does not operate any interoperable links with any other CCPs in relation to the SwapClear service (CCP Standards 19.4, 19.5).

19.1 Before entering into a link arrangement, and on an ongoing basis once the link is established, a central counterparty should identify, monitor and manage all potential sources of risk arising from the link arrangement. Link arrangements should be designed such that the central counterparty is able to comply with these CCP Standards.

Identifying link-related risks

LCH.C Ltd maintains links with multiple CSDs and TRs with respect to its SwapClear service. A link for the purposes of this standard is any connection that is made with another FMI according to a set of contractual and operational arrangements, irrespective of the complexity or otherwise of the link and whether it is directly with the FMI or through an intermediary.⁹⁵ LCH.C Ltd does not operate any interoperable links with any other CCPs in relation to the SwapClear service.⁹⁶

LCH.C Ltd links with TRs for the purpose of reporting cleared OTC transaction data. LCH.C Ltd does not rely on TRs for the provision or maintenance of any data for its own operations. Accordingly, LCH.C Ltd's links with TRs do not give rise to material operational or financial risks or interdependencies. Nevertheless, such links could give rise to reputational or regulatory and compliance risks. LCH.C Ltd mitigates these risks via: selection of TRs in accordance with the LCH.C Group Procurement Policy (where allowed under regulatory requirements); monitoring of each TR's operational performance; review of proposed regulatory changes; and mandatory inclusion of the Regulatory Reporting Team for all projects under LCH.C Ltd's new change management process, which should ensure a targeted assessment of regulatory risk.

With respect to the SwapClear service, LCH.C Ltd's links with CSDs provide for the transfer and lodgement of acceptable non-cash collateral from participants and investment of its own assets (see CCP Standards 5.1 and 15.1).⁹⁷ LCH.C Ltd has a link with Austraclear, an Australian-domiciled CSD and SSF, to support its Australian operations, including its management of its AUD liquidity needs and the operation of its ESA (see CCP Standard 7 and CCP Standard 9).

The LCH.C Group Settlement, Payment and Custody Risk Policy identifies legal, operational and liquidity risks arising from LCH.C Ltd's links to CSDs; this policy also governs LCH.C Ltd's use and choice of CSDs. LCH.C Ltd requests detailed information from CSDs it is considering establishing a link with

94 The CSDs used to hold LCH.C Ltd's non-cash collateral and investments in relation to the SwapClear service also provide securities transfer and settlement functions, and will be referred to simply as CSDs for the remainder of the standard.

95 Links to payment systems are addressed in CCP Standard 9.

96 LCH.C Ltd maintains interoperable links with European Central Counterparty N.V. and Six X-Clear Limited for cash equities clearing, and with Oslo Clearing for clearing of cash equities and certain exchange-traded derivatives.

97 LCH.C Ltd also uses custodians for the transfer and lodgement of non-cash collateral; as discussed in CCP Standard 15, custodians are subject to the same due diligence processes as linked CSDs.

before entering into any contractual arrangements. Information requested includes financial data, as well as details of service availability, business continuity, default management arrangements and internal controls (see CCP Standard 15.2). The LCH.C Group Operations department, in conjunction with the Group Legal department, performs due diligence prior to CSD link establishment, with the LCH.C Ltd ERCo responsible for final approval upon request from CaLM, Operations or Clearing Services (see CCP Standard 15.2 for more details).

LCH.C Ltd's process for reviewing prospective and existing CSD links aims to mitigate risks associated with such links (including operational and custody risks), ensuring that its link arrangements do not compromise LCH.C Ltd's continued ability to observe the CCP Standards. LCH.C Ltd's Settlement Finality Regulations seek to ensure that the transfer of securities for collateral purposes within its linked CSDs is final at the time specified by the CSD (see CCP Standard 8.1).

Managing operational risk

Operational risks arising from LCH.C Ltd's links with FMIs are identified and managed in accordance with the ORP and ORM (CCP Standard 16.1). Operational incidents related to LCH.C Ltd's interaction with its CSDs would be dealt with as per the LCH.C Ltd Incident Management Process (CCP Standard 16.2). Changes to LCH.C Ltd's operations that may impact its links with CSDs are assessed in accordance with LCH.C Ltd's Change Management Framework (see CCP Standard 16.2).

As required under the Group Settlement, Payment and Custody Risk Policy, LCH.C Ltd performs operational due diligence on all CSDs both prior to, and at least every two years following, link establishment (CCP Standard 15.2). This due diligence covers matters including BCM and service availability. LCH.C Ltd must also have at least one formalised and regularly tested backup arrangement for securities settlement; contingency plans must be maintained if a backup system is not in place. LCH.C Ltd's link with Austraclear is also subject to these requirements.

The LCH.C Ltd Operations Management team monitors the level of service provided by CSDs and reports to the LCH.C Ltd ERCo quarterly. Although no operational standards are prescribed, management will engage with a CSD if shortcomings are identified (CCP Standard 15.2).

Managing financial risk

LCH.C Ltd is exposed to potential financial risks, including liquidity and custody risks, as a result of its links with CSDs. LCH.C Ltd requests information from each of its CSDs to enable it to calculate ICSs for each CSD in accordance with the LCH.C Group Counterparty Credit Risk Policy (CCP Standard 15.3). Overnight unsecured cash balances with CSDs are monitored, and CSDs used in the securities settlement or custody process with regard to a particular participant cannot belong to the same group as that participant. As noted in 'Managing operational risk' above and CCP Standard 19.2, LCH.C Ltd conducts operational and legal due diligence to mitigate potential financial risks by seeking to ensure that LCH.C Ltd has prompt access to its own and its participants' collateral in the event of a CSD default (CCP Standards 1.2, 15.2). Settlement finality within securities settlement systems is supported by LCH.C Ltd's designation under the UK *Financial Markets and Insolvency (Settlement Finality) Regulations 1999* (see CCP Standard 8.1).

LCH.C Ltd's Recovery Plan involves analysis of the potential impact upon itself or its linked FMIs in the event either party enters a recovery scenario. This analysis considers, among other things, the impact from operational failures, liquidity issues and a reduction in overall creditworthiness (see CCP Standard 3.5). Any backup or contingency options available to mitigate such impacts are also

considered. For example, LCH.C Ltd has contingency arrangements in place to facilitate settlement at its linked CSDs in the event SWIFT and the CMS were down.

19.2 A link should have a well-founded legal basis, in all relevant jurisdictions, that supports its design and provides adequate protection to the central counterparty and other FMIs involved in the link.

LCH.C Ltd's arrangements with its linked CSDs are governed by contractual agreements, which specify the law governing the agreement. LCH.C Ltd conducts legal due diligence prior to and at least every two years following entry into such arrangements, to ensure that the assets belonging to LCH.C Ltd or its clearing participants are fully segregated, identifiable and accessible promptly in the event of a clearing participant default or the insolvency of a linked CSD (see CCP Standards 1.2, 15.2). When conducting due diligence on a non-UK domiciled custodian or CSD, LCH.C Ltd also seeks legal advice on that jurisdiction.

19.3 Where relevant to its operations in Australia, a central counterparty should consult with the Reserve Bank prior to entering into a link arrangement with another FMI.

LCH.C Ltd joined Austraclear as a Special Purpose (Exchange) Participant during the Assessment period, to support its management of its AUD liquidity needs and the operation of its ESA (see CCP Standards 7 and 9). LCH.C Ltd consulted with the Bank throughout the establishment of its link with Austraclear.

19.4 Before entering into a link with another central counterparty, a central counterparty should identify and manage the potential spillover effects from the default of the linked central counterparty. If a link has three or more central counterparties, a central counterparty should identify, assess and manage the risks of the collective link arrangement.

LCH.C Ltd does not currently operate any interoperable links with any other CCPs in relation to the SwapClear service.

19.5 A central counterparty in a central counterparty link arrangement should be able to cover, at least on a daily basis, its current and potential future exposures to the linked central counterparty and its participants, if any, fully with a high degree of confidence without reducing the central counterparty's ability to fulfil its obligations to its own participants at any time.

LCH.C Ltd does not currently operate any interoperable links with any other CCPs in relation to the SwapClear service.

Standard 20: Disclosure of rules, key policies and procedures, and market data

A central counterparty should have clear and comprehensive rules, policies and procedures and should provide sufficient information and data to enable participants to have an accurate understanding of the risks they incur by participating in the central counterparty. All relevant rules and key policies and procedures should be publicly disclosed.

LCH.C Ltd publicly discloses its Rules and Procedures and a range of additional relevant information related to its risk management procedures (CCP Standard 20.1). This includes information regarding the process of novation, and general descriptions of system design and the roles and obligations of LCH.C Ltd and its clearing participants (CCP Standards 20.2, 20.3). LCH.C Ltd provides new clearing

participants with comprehensive training and documentation, and has a range of refresher training courses available to existing clearing participants on an ad hoc basis (CCP Standard 20.4). LCH.C Ltd makes general information regarding its services and key data available on its website (CCP Standard 20.5). In September 2015, LCH.C Ltd published a qualitative disclosure document that provides responses to the CPMI-IOSCO *Disclosure Framework for Financial Market Infrastructures* (see CCP Standard 20.5).

The Bank expects LCH.C Ltd to carry out its plans to regularly publish risk and activity data in accordance with the CPMI-IOSCO quantitative disclosure standards for CCPs. In addition, the Bank will discuss with LCH.C Ltd the development of additional disclosures to assist participants in understanding their contingent exposure to the use of loss allocation tools. The Bank will also discuss with LCH.C Ltd the adequacy of its disclosure of investment risks to participants in light of its arrangements to allocate investment losses in excess of €15 million to participants.

20.1 A central counterparty should adopt clear and comprehensive rules, policies and procedures that are fully disclosed to participants. Relevant rules and key policies and procedures should also be publicly disclosed (including specific requirements relating to CCP Standards 1.4, 2.2, 12.3, 13.4, 15.4, 17.2 and 17.3).

The LCH.C Ltd Rulebook governs the rights and responsibilities of LCH.C Ltd and its participants in respect of the clearing services provided by LCH.C Ltd, and sets out the day-to-day operation of the business. LCH.C Ltd's key policies are reflected in information available in its Rulebook and Procedures, which are publicly available on the LCH.C Group website.⁹⁸ This includes information on the expected coverage of initial and variation margin requirements, the process for managing a clearing participant default, acceptable collateral and haircuts, governance arrangements, participation requirements, and segregation and portability arrangements.

To assist participants in their understanding of the risks of participating in LCH.C Ltd's clearing services, and for the information of other interested stakeholders, a range of additional material is published on the LCH.C Group public website. Information specific to LCH.C Ltd includes details of the LCH.C Ltd risk management framework, such as the PAIRS margin methodology, PPS arrangements, collateral requirements, DMP and default waterfalls. Information on LCH.C Ltd's participation requirements (including those specific to the SwapClear service), the membership application process and membership fees is also available on the LCH.C Group website.

Detailed information specific to the SwapClear service is available on the SwapClear public website. This website describes the products that are eligible to be cleared through the SwapClear service, and additional service offerings such as trade compression. Additional information also available on the SwapClear website includes the details of the SwapClear clearing process, different types of client account segregation and the details of regulations affecting the SwapClear service. The SwapClear and LCH.C Group websites also contain 'members only' sections, allowing LCH.C Ltd to disseminate additional information to clearing participants in a secure manner.

Specific disclosure requirements are dealt with under CCP Standards 1.4, 2.2, 12.3, 13.4, 15.4, 17.2, and 17.3.

20.2 A central counterparty's rules, policies and procedures should clearly identify the nature and scope of the risk exposure assumed by the central counterparty, such as by novation, open offer or other similar legal devices. A central counterparty's rules, policies and

98 Available at: <<http://www.lchclearnet.com/rules-regulations/rulebooks/ltd>>.

procedures should clearly identify the point in the clearing process at which the central counterparty assumes the risk exposure.

The LCH.C Ltd Rulebook outlines the nature and scope of novation for those services to which novation applies (see CCP Standard 1.2).⁹⁹ Specifically, upon registration of a contract, LCH.C Ltd replaces this contract with two open contracts on the same terms as the original contract (one between the seller participant and LCH.C Ltd as the buyer; and one between the buyer participant and LCH.C Ltd as the seller). Each party contracts as principal to these contracts, irrespective of whether the clearing participant is transacting on its own behalf or on behalf of a client. As a result of novation, LCH.C Ltd becomes counterparty to each open contract and it is obliged under the LCH.C Ltd Rulebook to perform its obligations under the terms of such open contracts as principal.

20.3 A central counterparty should disclose clear descriptions of the system's design and operations, as well as the central counterparty's and participants' rights and obligations, so that participants can assess the risks they would incur by participating in the central counterparty (see CCP Standards 2.8 and 9.5).

LCH.C Ltd's Rulebook details LCH.C Ltd's and its participants' rights and obligations, including the degree of discretion that relevant parties are able to exercise under certain circumstances. LCH.C Ltd's Rulebook and Procedures also set out LCH.C Ltd's and its participants' rights and obligations relating to specific events, including the DMP (see CCP Standard 12) and invocation of the business continuity arrangements (see CCP Standard 16.7).¹⁰⁰ These documents describe which parties are to be notified of specific events, and timetables for decision making and notification. Additional information is available on the LCH.C Ltd website, including about the structure of LCH.C Ltd's default waterfalls, an explanation of LCH.C Ltd's PPS arrangements, and the list of current PPS banks and PPS bank requirements.

LCH.C Ltd also provides each SwapClear participant with the SwapClear Service Description, which provides an overview of the SwapClear service and its operational features. The document covers key aspects such as: trade validation and registration; SwapClear clearing fees; margining; default management; LCH.C Ltd's PPS; and SwapClear's daily operational timeline. This document also contains detailed information regarding SwapClear data available to participants, SwapClear margin multipliers and the pricing of SwapClear products. In addition, SwapClear provides its participants with access to a margin calculation tool that allows them to estimate initial margin obligations.

20.4 A central counterparty should provide all necessary and appropriate documentation and training to facilitate participants' understanding of the central counterparty's rules, policies and procedures and the risks they face from participating in the central counterparty.

LCH.C Ltd runs an introductory training course twice a year for clearing participants, in addition to providing the service description discussed under CCP Standard 20.3. This course is designed as a comprehensive guide to the mechanics of cleared markets and products for new entrants and clearing participant staff not directly involved in derivatives. Refresher operational training is provided for any

99 See Regulations 12 (Novation) and 16 (Registration), LCH.C Ltd General Regulations, pp. 76 – 84. Available at <<http://www.lchclearnet.com/documents/731485/762691/general+regulations+-+03.11.14.pdf>>.

100 See the Default Rules and Business Continuity Procedures. Available at <<http://www.lchclearnet.com/documents/731485/762691/Default+Rules.pdf>> and <<http://www.lchclearnet.com/documents/731485/762691/Procedures+section+6+-+Business+Continuity.pdf>>, respectively.

existing member on an ad hoc basis, as required, and additional training courses offered by LCH.C Ltd focus on specific exchanges and markets for which LCH.C Ltd acts as CCP.

In the event that a clearing participant's behaviour demonstrated a lack of understanding of applicable rules, policies and procedures, that participant may be required to undertake additional training. When a clearing participant requires additional training, the LCH.C Ltd Member Training team will liaise with relevant relationship manager and clearing participant to organise a tailored training course. Outside of formal training, dedicated LCH.C Ltd staff are available to assist clearing participants where necessary.

LCH.C Ltd also provides regular information to clearing participants to assist them in understanding and managing the potential financial risks from participating in SwapClear. An anonymised version of the LCH.C Ltd quarterly stress-testing report is made available on its member website following the quarterly LCH.C Ltd Risk Committee meeting. LCH.C Ltd may also provide stress-testing reports of clearing participant and client accounts upon request. Clearing participants are informed of relevant aspects of LCH.C Ltd's business continuity arrangements through regular testing of these arrangements.

The Bank expects to engage further with LCH.C Ltd over the 2015/16 period regarding its disclosures to participants with respect to two specific exposures they face from participating in the CCP. The Bank will discuss with LCH.C Ltd the development of additional disclosures to assist participants in understanding their contingent exposure to the use of loss allocation tools. Relatedly, the Bank will also discuss with LCH.C Ltd the adequacy of its disclosure of investment risks to participants in light of its arrangements to allocate investment losses in excess of €15 million to participants.

20.5 A central counterparty should complete regularly and disclose publicly responses to the CPSS-IOSCO *Disclosure Framework for Financial Market Infrastructures*.¹⁰¹ A central counterparty also should, at a minimum, disclose basic risk and activity data, as directed by the Reserve Bank from time to time.

In September 2015, LCH.C Ltd published a qualitative disclosure document that provides responses to the CPMI-IOSCO *Disclosure Framework for Financial Market Infrastructures* and describes its approach to meeting the Principles.¹⁰² LCH.C Ltd will update this document internally at least once every year, and is still considering the frequency with which it will publish revisions to this document.

LCH.C Ltd expects to publish a quantitative disclosure for the SwapClear service, to meet the CPMI-IOSCO quantitative disclosure standards, by 1 January 2016. The Bank will continue to monitor LCH.C Ltd's steps to meet this disclosure requirement.

Basic data, including the names of LCH.C Ltd's direct clearing participants, LCH.C Ltd's financial statements and transaction volumes and values, are made publicly available on the LCH.C Group website.¹⁰³

101 The CPSS was renamed the CPMI in September 2014.

102 Available at http://www.lchclearnet.com/documents/731485/762558/CPMI_IOSCO_Assessment_of_LCH+ClearnetLtd+2014.pdf.

103 Membership information is available at <http://www.lchclearnet.com/members-clients/members/current-membership>>. Financial statements are available at <http://www.lchclearnet.com/about-us/annual-reports-statements>>. Volumes data are available at <http://www.lchclearnet.com/asset-classes/otc-interest-rate-derivatives/volumes>>.

Standard 21: Regulatory reporting

A central counterparty should inform the Reserve Bank in a timely manner of any events or changes to its operations or circumstances that may materially impact its management of risks or ability to continue operations. A central counterparty should also regularly provide information to the Reserve Bank regarding its financial position and risk controls on a timely basis.

The Bank holds regular meetings with LCH.C Ltd to discuss matters relevant to its compliance with the CCP Standards, and related aspects of its risk management and operational arrangements. The Bank has been kept informed of relevant developments during the Assessment period (CCP Standard 21.1). LCH.C Ltd provides the Bank with financial, activity, risk and operational data and reports on a regular and timely basis (CCP Standard 21.2).

21.1 A central counterparty should inform the Reserve Bank as soon as reasonably practicable if:

(a) it breaches, or has reason to believe that it will breach:

(i) a CCP Standard; or

(ii) its broader legislative obligation to do, to the extent that it is reasonably practicable to do so, all things necessary to reduce systemic risk;

(b) it becomes subject to external administration, or has reasonable grounds for suspecting that it will become subject to external administration;

(c) a related body to the central counterparty becomes subject to external administration, or if the central counterparty has reasonable grounds for suspecting that a related body will become subject to external administration;

(d) a participant becomes subject to external administration, or if the central counterparty has reasonable grounds for suspecting that a participant will become subject to external administration;

(e) a participant fails to meet its obligations under the central counterparty's risk control requirements or has its participation suspended or cancelled because of a failure to meet the central counterparty's risk control requirements;

(f) it fails to enforce any of its own risk control requirements;

(g) it plans to make significant changes to its risk control requirements or its rules, policies and procedures;

(h) it or a service it relies on from a third party or outsourced provider experiences a significant operational disruption, including providing the conclusions of its post-incident review;

(i) any internal audits or independent external expert reviews are undertaken of its operations, risk management processes or internal control mechanisms, including providing the conclusions of such audits or reviews;

(j) its operations or risk controls are affected, or are likely to be affected, by distress in financial markets;

(k) it has critical dependencies on utilities or service providers, including providing a description of the dependency and an update if the nature of this relationship changes;

(l) it proposes to grant a security interest over its assets (other than a lien, right of retention or statutory charge that arises in the ordinary course of business);

(m) it proposes to incur or permit to subsist any loans from participants or members unless such loans are subordinated to the claims of all other creditors of the central counterparty; or

(n) any other matter arises which has or is likely to have a significant impact on its risk control arrangements (see also CCP Standards 1.6, 16.10 and 19.3).

The Bank and LCH.C Ltd hold two scheduled meetings each quarter:

- A business and regulatory developments meeting to discuss progress towards the Bank's regulatory priorities, and any changes to LCH.C Ltd's business or operations which may affect LCH.C Ltd's compliance with the CCP Standards. This meeting involves relevant members from LCH.C Ltd's management team. ASIC staff members also routinely attend.
- A working-level meeting primarily to discuss data submitted to the Bank by LCH.C Ltd under CCP Standard 21.2. This meeting involves LCH.C Ltd staff members responsible for clearing risk policy and implementation of risk management arrangements.

These meetings provide a forum for the discussion of material developments, both in LCH.C Ltd's Australian operations and its business and approach to risk management more broadly. Matters discussed in the scheduled meetings are followed up, as appropriate, in more focused targeted sessions. The Bank and LCH.C Ltd also hold ad hoc meetings to discuss relevant matters as required.

The Bank expects to be notified immediately of any significant developments in LCH.C Ltd's risk exposure as set out in this sub-standard; for example, if LCH.C Ltd has reason to believe that a participant default may be imminent or there was evidence of distress in markets cleared by SwapClear. In addition, LCH.C Ltd and the Bank have a Cooperation Arrangement in place, a function of which is to complement the notification obligations under this sub-standard.¹⁰⁴ The Cooperation Arrangement was updated during the Assessment period to reflect the extension of the SwapClear service to include the clearing of inflation rate derivatives.

During the 2014/15 Assessment period, LCH.C Ltd kept the Bank up to date regarding changes to its governance arrangements and current issues in risk management, including its management of operational incidents, the status of important projects and its progress towards addressing the Bank's regulatory priorities.

21.2 A central counterparty should also provide to the Reserve Bank, on a timely basis:

(a) audited annual accounts;

(b) management accounts on a regular basis, and at least quarterly;

(c) risk management reports, including detailed information on margining and stress testing, on a regular basis, and at least quarterly;

(d) periodic activity, risk and operational data, as agreed with the Reserve Bank; and

¹⁰⁴ Under s824B(2) of the *Corporations Act 2001*, the Minister may grant an overseas CS facility an Australian CS facility licence if, among other things, he or she is satisfied that the applicant undertakes to cooperate with the Bank by sharing information and in other ways. The Cooperation Arrangement formalises this undertaking and complements notification obligations under CCP Standards 21.1 and 21.2.

(e) any other information as specified by the Reserve Bank from time to time.

As noted in CCP Standard 21.1, the Bank and LCH.C Ltd have a Cooperation Arrangement in place, which, among other things, specifies LCH.C Ltd's reporting requirements to the Bank under this sub-standard.

Audited annual reports are published on the LCH.C Group public website, and LCH.C Ltd provides the Bank with monthly management accounts including balance sheet, income, and collateral information for each of its service lines.¹⁰⁵

LCH.C Ltd provides a monthly risk management report to the Bank, including information on backtesting results, adequacy of financial resources, and current issues in risk management. Data provided quarterly to the Bank include changes to participants' ICSs, initial margin held, stress-test results, collateral holdings and summaries of operational incidents. As noted in CCP Standard 21.1, the quarterly working-level meeting between the Bank and LCH.C Ltd provides a forum for discussion of developments observed in the data.

From time to time, the Bank will request additional information from LCH.C Ltd on topics of interest, particularly in regard to any operational incidents or the status of projects with significant risk implications.

105 Audited annual reports are available at <<http://www.lchclearnet.com/about-us/annual-reports-statements>>.

Abbreviations

| | | | |
|---------------|--|-------------|--|
| AIP | Auction Incentive Pool | CSD | Central securities depository |
| ALCo | Asset and Liquidity Committee | CTO | Chief Technical Officer |
| AMUG | Australian Member User Group | DCMT | Default Crisis Management Team |
| ANZ | Australia and New Zealand Banking Group Limited | DCO | Derivatives Clearing Organisation |
| ASIC | Australian Securities and Investments Commission | DFAM | Default fund additional margin |
| BCM | Business Continuity Management | DMG | Default Management Group |
| BCP | Business Continuity Plan | DMP | Default Management Process |
| BoE | Bank of England | EC | European Commission |
| CaLM | Collateral and Liquidity Management | EMIR | 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 |
| CaLRM | Collateral and Liquidity Risk Management | ERCo | Executive Risk Committee |
| CBA | Commonwealth Bank of Australia | ESA | Exchange Settlement Account |
| CCO | Chief Compliance Officer | EU | European Union |
| CCP | Central counterparty | ExCo | Executive Committee |
| CCP Standards | Financial Stability Standards for Central Counterparties | FCM | Futures Commission Merchant |
| CEO | Chief Executive Officer | FEX | Financial and Energy Exchange |
| CFO | Chief Financial Officer | FMI | Financial market infrastructure |
| CFR | Council of Financial Regulators | FSMA | Financial Services and Markets Act 2000 |
| CFTC | U.S. Commodity Futures Trading Commission | FSS | Financial Stability Standards |
| CMG | Crisis Management Group | FX | Foreign exchange |
| CMRC | Credit Risk Management Committee | GMRA | Global Master Repurchase Agreement |
| CMS | Collateral Management System | HR | Human Resources |
| CMT | Crisis Management Team | ICS | Internal credit score |
| COO | Chief Operating Officer | ICSD | International central securities depository |
| COS | Chief of Staff | IOSCO | International Organization of Securities Commissions |
| CPMI | Committee on Payments and Market Infrastructures | IRD | Interest rate derivative |
| CPSS | Committee on Payment and Settlement Systems | ISA | Individually segregated account |
| CRMC | Credit Risk Management Committee | IT | Information technology |
| CRO | Chief Risk Officer | LCH.C Group | LCH.Clearnet Group Limited |
| CS | Clearing and settlement | LCH.C LLC | LCH.Clearnet LLC |
| CSCC | Cyber Security and Continuity Committee | LCH.C Ltd | LCH.Clearnet Limited |

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|----------|----------------------------------|--------|--|
| LCH.C SA | LCH.Clearnet SA | PAIRS | Portfolio Approach to Interest Rate Risk |
| LCR | Liquidity coverage ratio | PPS | Protected Payments System |
| LIBOR | London Interbank Offered Rate | PPSA | Personal Property Securities Act 2009 |
| LMC | Local Management Committee | PSNA | Payment System and Netting Act 1998 |
| LSEG | London Stock Exchange Group plc | SCCS | SwapClear Client Clearing Service |
| LuxCo | LCH.Clearnet Luxembourg | SLA | Service Level Agreement |
| MoU | Memorandum of Understanding | SRR | Special Resolution Regime |
| MRMC | Market Risk Management Committee | SSC | Shared service company |
| NAB | National Australia Bank Limited | SSF | securities settlement facility |
| NCA | National competent authority | STLOIM | Stress-test Losses Over Initial Margin |
| NPACo | New Product Approval Committee | RTTR | Real-time trade registration |
| OIS | Overnight index swap | TR | Trade repository |
| ORD | Operational Risk Department | UK | United Kingdom |
| ORM | Operational Risk Manual | US | United States |
| ORP | Operational Risk Policy | VMGH | Variation Margin Gains Haircutting |
| OSA | Omnibus segregated account | WBC | Westpac Banking Corporation |
| OTC | Over-the-counter | | |