

Assessment of LCH Limited's SwapClear Service

December 2021

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Executive Summary

This report presents the Reserve Bank of Australia's 2020/21 Assessment of LCH Limited's SwapClear service. SwapClear is a systemically important central counterparty (CCP) in Australia, clearing around 90 per cent of the cleared AUD over-the-counter (OTC) interest rate derivatives (IRD) market. This market is used by banks and corporations to manage interest rate risk and to take speculative positions. The Bank has concluded that LCH Ltd has conducted its affairs in a way that promotes overall stability in the Australian financial system.

LCH Ltd has made progress towards meeting the regulatory priorities set by the Bank, but these will remain open as more work needs to be completed:

- *Extend operating hours:* LCH Ltd has been working to extend SwapClear's operating hours to cover the Australian business day. In the first half of 2022, LCH Ltd is planning to move to a 24 hours, 5 days per week (24x5) operating model, as well as opening each Monday morning by 7am Sydney time. Ahead of this final step, LCH Ltd brought forward SwapClear's Monday morning opening time by four hours in September, allowing it to open by 11am Sydney time.
- *Strengthen contingency arrangements for payments:* LCH Ltd has been strengthening its contingency arrangements through which cash payments, such as variation margin, can be made between LCH Ltd and its participants in the event of an outage at a payment bank. During the assessment period, LCH Ltd tested these arrangements with participants and demonstrated their capability to handle an outage at a large payment bank. Further work is planned to ensure the process is robust and suitably embedded within LCH Ltd's systems.

Other key developments the Bank took into consideration included:

- *Benchmark reforms:* the management of operational risks associated with global benchmark reforms, and SwapClear's preparations for the transition away from the London Interbank Offered Rate (LIBOR).
- *Cyber risk management:* enrichments to LCH Ltd's reporting and control frameworks for cyber risk management as part of its broader strategy to improve its cyber capabilities.

1. Regulatory Environment

LCH Ltd is a UK-based CCP licensed to operate its SwapClear service in Australia under section 824B(2) of the *Corporations Act 2001*, which provides licensing for an overseas-based clearing and settlement (CS) facility subject to requirements and supervision in its home country that are considered sufficiently equivalent to those in Australia.

The Bank of England (BoE) is LCH Ltd's primary supervisor in the UK, where LCH Ltd is a 'recognised central counterparty' under the *UK Financial Services and Markets Act 2000*. The BoE takes a risk-based approach to oversight, prioritising its supervisory efforts in areas where it considers risks to financial stability are greatest, with a current focus on the operational and financial resilience of LCH Ltd. Assessments of LCH Ltd are conducted at least annually, and the BoE sets supervisory priorities outlining its expectations of any risk-mitigating actions LCH Ltd should take. The BoE also conducts thematic reviews across all CCPs for which it has oversight responsibility. The Bank generally defers to the BoE on issues the BoE has identified as priorities.

Following the conclusion of the UK transition period on 31 December 2020, the BoE is now overseeing CCPs under the UK's 'onshored' version of the European Market Infrastructure Regulation (EMIR) (see also section 3.1 - Brexit). The core regulatory standards and supervisory powers of the BoE have not changed and the BoE continues to hold LCH Ltd to the same high regulatory and supervisory standards it had in place prior to the end of the transition period.

The Bank has a memorandum of understanding in place with the BoE regarding the supervision of CS facilities.¹ The memorandum provides a framework for bilateral cooperation, including information sharing and investigative assistance. The Bank also engages with the BoE on supervisory matters through the LCH Ltd Global College and Crisis Management Group.

In Australia, LCH Ltd's SwapClear service is considered systemically important, clearing around 90 per cent of the notional value of the cleared AUD OTC IRD market, and is subject to an ongoing assessment against the relevant *Financial Stability Standards for Central Counterparties* (CCP Standards) over a rolling four-year period. This work complements the work carried out by the BoE as LCH Ltd's primary regulator. In addition to tracking progress against our regulatory priorities and areas of supervisory focus, staff completed a review of LCH Ltd against six CCP Standards during the current assessment period: collateral (CCP Standard 5), liquidity (CCP Standard 7), general business risk (CCP Standard 14), custody and investment risks (CCP Standard 15), disclosure (CCP Standard 20) and regulatory reporting (CCP Standard 21). These detailed compliance assessments are not published.

1 The memorandum is available at <<http://www.rba.gov.au/payments-and-infrastructure/payments-system-regulation/pdf/memorandum-2015-05-25.pdf>>.

2. Summary of Supervisory Activities

This section summarises the Bank's regulatory priorities and areas of supervisory focus for LCH Ltd and the progress that has been made on these issues over the assessment period.

2.1 Regulatory Priorities

The Bank sets regulatory priorities for LCH Ltd based on its assessment of LCH Ltd against the relevant CCP Standards. These priorities reflect the Bank's expectations regarding actions that LCH Ltd should take to enhance its observance of the CCP Standards and promote stability in the Australian financial system.

2.1.1 Extension of operating hours

Extension of operating hours. LCH Ltd should continue its work to extend the operating hours of the SwapClear service over the medium term, while maintaining the resilience of its operations; it should keep the Bank informed of its progress. LCH Ltd's future business developments should not negatively affect operating hours.

CCP Standards 6 (Margin) and 16 (Operational Risk)

The SwapClear service is currently closed for four hours of the Australian business day. Australian participants' trades are not cleared while the service is closed, so they are required to manage bilateral credit risk exposures until the service reopens. The SwapClear service is officially open from 6am UK time to 7pm New York time (5pm-11am Sydney summer time), but can open up to two hours earlier at LCH Ltd's discretion as part of its flexible opening arrangements. In practice, LCH Ltd opened the service at 4am UK time (3pm Sydney summer time) on most business days during the assessment period.

In the previous assessment period, LCH Ltd provided the Bank with a plan to fully address the operating hours regulatory priority by moving to a 24x5 operating model, and opening on Sunday evening UK time to accommodate trading in the Asia-Pacific region on Monday mornings. LCH Ltd has provided the Bank with ongoing updates on the implementation of its 24x5 plan. In August, LCH Ltd completed the technical enhancements required to facilitate the 24x5 operation of the SwapClear service. As part of a phased roll-out of functionality, LCH Ltd extended its official and flexible opening arrangements on Monday mornings by 4 hours on 27 September, which has seen SwapClear commence clearing trades from midnight Monday UK time (11am Sydney summer time). It is expected that the full transition to 24x5 operations for the SwapClear service, including opening at 8pm Sunday UK time (7am Sydney summer time), will occur in the first half of 2022.

In the next assessment period, LCH Ltd is expected to continue to provide the Bank with regular updates on its progress as it implements the final stages of its transition to 24x5 operation of the SwapClear service while maintaining the safety and operational resilience of the service.

2.1.2 Protected Payment System contingencies

Protected Payment System (PPS) contingencies. LCH Ltd should continue to implement its plans to enhance the effectiveness of its PPS contingencies, enabling the expected service level to be achieved in the event of a PPS bank outage or failure.

CCP Standard 9 (Money settlements)

The PPS is LCH Ltd's payments system through which all cash payments are settled between LCH Ltd and its participants. LCH 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/receive payments to/from the LCH Ltd 'concentration bank' via the relevant real-time gross settlement system for each currency.

In the event of a PPS bank outage, LCH Ltd expects participants to have access to contingency arrangements so they can continue to make/receive payments to/from LCH Ltd. The primary contingency method is direct funding, whereby participants make payments directly to LCH Ltd's concentration bank.

Over recent assessment periods, LCH Ltd has been working towards improving its direct funding contingency arrangements, and has set objectives around the performance of these arrangements. These criteria include the ability to process all end-of-day margin calls for the largest PPS bank within a business day, have the capacity to make ad-hoc intra-day calls if required, and ensure that any liquidity requirements arising from the contingency solution can be covered on a timely basis.

During the current assessment period, LCH Ltd commenced a rolling annual cycle of PPS contingency testing of all participants. The scale of these tests has progressively increased and is now representative of the conditions anticipated to be experienced during a large PPS bank outage. LCH Ltd has demonstrated its ability to issue calls within one hour of invoking the contingency arrangements and complete the process within its stated objectives. Most participants have been able to meet these calls in an acceptable timeframe. LCH Ltd is on track to complete a full testing cycle of all participants, including retesting participants who fail the tests, by the end of the year.

Additional improvements to these arrangements are planned over the coming months, including to enhance reporting to participants during a contingency event, and where appropriate these will be embedded within LCH's systems. As this work is ongoing, this regulatory priority has been carried forward to the 2021/22 assessment period.

2.2 Areas of Supervisory Focus

Areas of supervisory focus describe matters that the Bank currently considers to be an important part of its supervision of LCH Ltd's SwapClear service. This may be due to changes underway at LCH Ltd, updates to regulatory standards, or in response to developments in the broader risk environment.

2.2.1 Cyber risk management

Cyber risk management. LCH Ltd's ongoing work to enhance and embed its cyber risk management control framework.

CCP Standard 16 (Operational risk)

Over the past few years, LCH Ltd has been engaged in a program of works to enhance and improve its cyber risk management. Reflecting the degree of change taking place, the purpose of this area of supervisory focus has been for LCH Ltd to keep the Bank abreast of its cyber-related work.

During the assessment period, LCH Ltd has continued to implement aspects of its strategic program of works related to cyber risk management, with a focus on enriching its cyber control environment and developing more regular, standardised reporting for management. The BoE has been closely monitoring LCH Ltd's program of work and the Bank will continue to engage with the BoE on this topic, including through the LCH Ltd Global College.

In light of the continuously evolving cyber threat landscape and further enhancements planned for LCH Ltd's cyber risk management, the Bank will continue to monitor the outcomes of this work as these changes are embedded in the next assessment period.

2.2.2 Model validations

Model validations. The governance of LCH Ltd's independent model validation processes, including the appropriate documentation of LCH Ltd's benchmarking process against industry practice.

CCP Standards 2 (Governance) and 6 (Margin)

Suitably documented processes and procedures assist LCH Ltd to minimise key person risk and enable them to be subject to appropriate oversight. LCH Ltd had previously demonstrated that it performs suitable validations of its models, and has now updated its Independent Risk Model Validation procedure, outlining its methodology for benchmarking 'high importance' models. This area of supervisory focus has been closed.

2.2.3 Legal basis

Australian legal opinion. A new legal opinion from external advisers to LCH Ltd addressing Australian law issues arising through its operations in Australia, including the extent to which LCH Ltd's rules and related contracts are enforceable under Australian law.

CCP Standard 1 (Legal basis)

In the latter part of the assessment period, the Bank engaged with LCH Ltd to clarify the scope and requirements for a new Australian legal opinion to support the Bank's targeted review of certain aspects of LCH Ltd's legal basis which are governed by Australian law. Work on this area of supervisory focus will continue in the next assessment period.

3. Other Material Developments

During the assessment period, there were a number of other material developments relevant to the Bank's supervision of LCH Ltd's SwapClear service to the Australian market. Some of these are the result of changes to the regulatory environment and international developments impacting LCH Ltd, while others stemmed from the operational risk management at LCH Ltd.

3.1 Brexit

The regulatory regime for CCPs in the UK has changed since the previous Assessment, as the UK has now withdrawn from the EU and the transition period has concluded. Prior to 31 December 2020, LCH Ltd was supervised by the BoE under EMIR, which was considered sufficiently equivalent to the Australian regime. As part of the withdrawal process relevant EU law has been 'onshored', or converted into UK law, with only minor changes to enable these laws to work effectively in the UK context.² The BoE remains LCH Ltd's home regulator and continues to hold LCH Ltd to the same supervisory standards under the new regime.

The Australian Securities and Investments Commission (ASIC) and the Bank have considered the effect these changes may have on the sufficient equivalence of LCH Ltd's home regime and are of the view that it remains sufficiently equivalent to that of the Australian regulatory regime.

3.2 Benchmark reform

A key strategic focus for LCH Ltd over the past year has been to support ongoing interest rate benchmark reform initiatives through its role as the largest clearer of OTC IRD globally. In January, LCH Ltd adopted ISDA's supplemental definitions to provide its users with clarity over the treatment of contracts reliant on benchmarks should a cessation or pre-cessation event be triggered (such as where a regulatory body determines an existing benchmark is non-representative). LCH Ltd continues to introduce clearing for new risk-free rate products as they are established. LCH Ltd is also continuing to transition its discounting and price alignment interest for swaps to risk-free rates, such as for contracts settled in SGD to SORA in August.

In 2020, LCH Ltd began consulting with participants and clients regarding the conversion of outstanding EONIA and LIBOR contracts into standardised contracts referencing their corresponding recommended risk-free rate ahead of the benchmark cessation date. Respondents expressed a preference for the conversion to occur as close as possible to the cessation date and, in the case of IBOR trades, for the spread component to be adjusted in the trade attributes in order to assist in hedging effectiveness and risk management. With this in mind, the conversion of EONIA contracts to €STR took place in October 2021, while outstanding CHF, EUR, GBP and JPY LIBOR contracts are to be converted in December. The

² For further information, see *The Central Counterparties (Amendment, etc., and Transitional Provision) (EU Exit) Regulations 2018*. Available at <<https://www.legislation.gov.uk/uksi/2018/1184/contents/made>>; and *The Over the Counter Derivatives, Central Counterparties and Trade Repositories (Amendment, etc., and Transitional Provision) (EU Exit) Regulations 2019*. Available at <<https://www.legislation.gov.uk/uksi/2019/335/made/data.xht?view=snippet&wrap=true>>.

share of new trading activity in products referencing these risk-free rates has increased over the past year, supported by initiatives such as SOFR First and TONA First, which seek to prioritise interdealer trading in risk-free rates.

3.3 SwapClear operational incident

On Wednesday 24 February 2021 (GMT), a major operational incident at the SwapClear service led to an 8½ hour service outage (including SwapClear’s 2 hour flexible-open period) which spanned the Australian trading day. The incident prevented trade registration, required manual review for intraday margin calls and delayed the production of end-of-day reports. Despite the potential magnitude of the incident, the overall effects in this case were limited – trades were queued while the service was closed, SwapClear was not materially under-margined and brokers reportedly did not suspend client trading. The Bank is satisfied with the steps being undertaken by LCH Ltd to prevent similar incidents from occurring in the future and will continue to monitor these remediation actions as part of its regular supervisory activities.

4. Activity and Risk at SwapClear

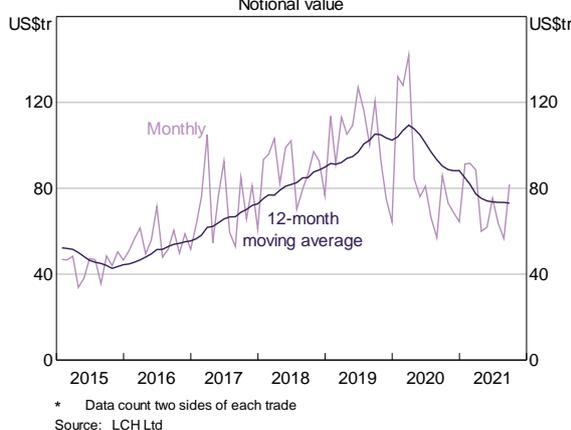
4.1 Global Activity

The notional value of new trades registered by SwapClear’s 122 direct participants during the assessment period consolidated at around US\$75 trillion per month across all currencies, after contracting from the peak seen in early 2020 (Graph 1).³

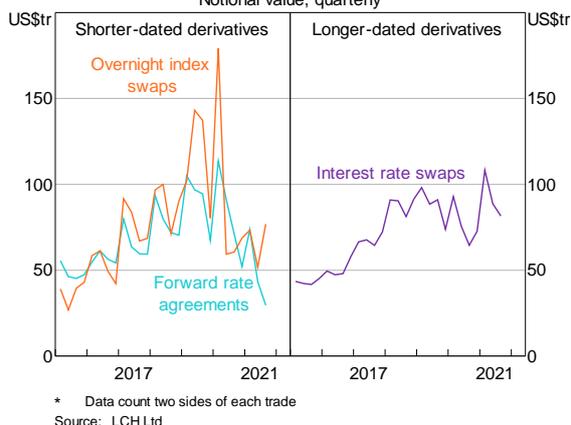
Activity in shorter-dated products, including forward rate agreements (FRA) and most activity in overnight interest rate swaps (OIS), have declined after spiking in early 2020. This largely reflected expectations that short-term interest rates across the advanced economies will remain low and stable for some time (Graph 2). By contrast, activity in interest rate swaps (IRS), which tend to be longer-dated products, increased. Reflecting these offsetting trends, the stock of derivatives outstanding was broadly stable with the composition shifting towards longer-dated products (Graph 3).

OIS, FRA and IRS accounted for 95 per cent of the notional value of trades registered.

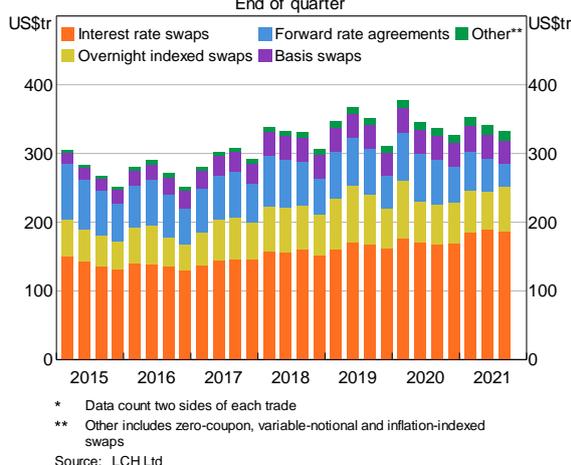
Graph 1
Trades Registered*
Notional value



Graph 2
SwapClear – Trades Registered by Product*
Notional value, quarterly



Graph 3
Notional Value Outstanding by Product*
End of quarter

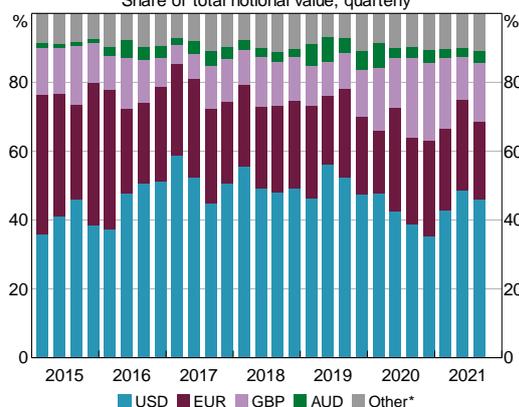


3 Unless otherwise stated, all positions data reported in this Appendix are as at 30 September 2021 while all activity data and growth rates are reported over the 12 months to this date.

SwapClear clears OTC interest rate derivatives in 27 currencies. Around 43 per cent of trades registered were denominated in USD, 25 per cent in EUR and 19 per cent in GBP (Graph 4). The AUD is SwapClear’s fourth most registered currency and accounts for around 3 per cent of trade registrations.

Total initial margin requirements, which is an indicator of the level of risk the CCP manages, declined since the peak in March 2020, but has remained above pre-pandemic levels (Graph 5). The relative importance of initial margin add-ons – called to cover risks not covered in the base initial margin model, such as specific credit, liquidity, concentration and sovereign risks – increased. As outlined in Box A, the change in the importance of add-ons during this period was largely due to the anti-procyclical effects of the unscaled initial margin floor add-on acting to partially offset some of the responsiveness of the base initial margin model to changes in market conditions.

Graph 4
Trades Registered by Currency
Share of total notional value, quarterly



* Other is BRL, CAD, CHF, CLP, CNY, COP, CZK, DKK, HKD, HUF, ILS, INR, JPY, KRW, MXN, NOK, NZD, PLN, SEK, SGD, THB, TWD and ZAR
Source: LCH Ltd

Graph 5
OTC Rates Initial Margin Requirements*
Daily



* The OTC Rates margin class includes all SwapClear products and those Listed Rates interest rate futures that have been moved for the purposes of portfolio margining
Source: LCH Ltd

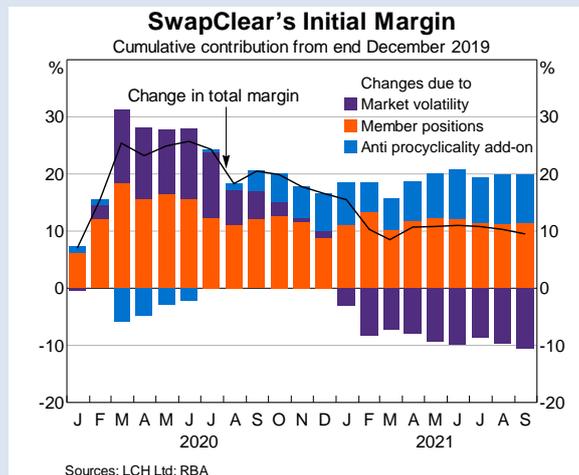
Box A: Initial Margin and Procyclicality

Initial margin (IM) forms part of the financial resources of a CCP that will be used in the event of a participant default. It is designed to cover most but not all losses on a participant’s portfolio based on historical price movements. It also covers risks arising from the specific positioning of participant portfolios – including credit, liquidity, concentration and sovereign risks. IM is responsive to changes in the composition of the participant’s portfolio and market conditions such as market volatility or the correlation of different assets.

CCPs must manage a trade-off between the responsiveness of their IM model to changes in market conditions with the extra liquidity demands imposed on participants. An IM model that is more responsive to market conditions will place greater liquidity demands on participants at times of high volatility, whereas a model that is less responsive to market conditions may result in higher IM than would otherwise be required during less volatile periods. To control the procyclicality of its IM model, SwapClear limits the extent to which its participant’s IM requirements can decline during periods of low market volatility; that is, it imposes an IM ‘floor’.

The COVID-19 pandemic offers a unique period to consider the effectiveness of SwapClear’s procyclicality controls. In the first quarter of 2020, SwapClear’s IM requirements increased by around 25 per cent. Most of the increase was attributable to participants taking on larger risk positions (orange bars in Graph 6). While the base IM model did respond in a procyclical fashion to market volatility associated with the onset of COVID-19 (purple bars), these effects were cushioned by the offsetting effect of the IM floor add-on (blue bars).

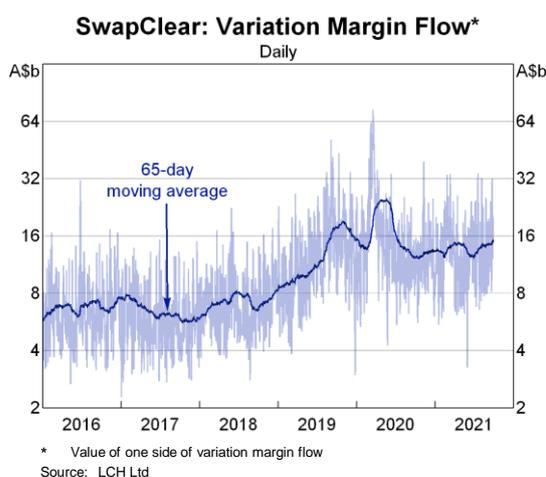
Graph 6



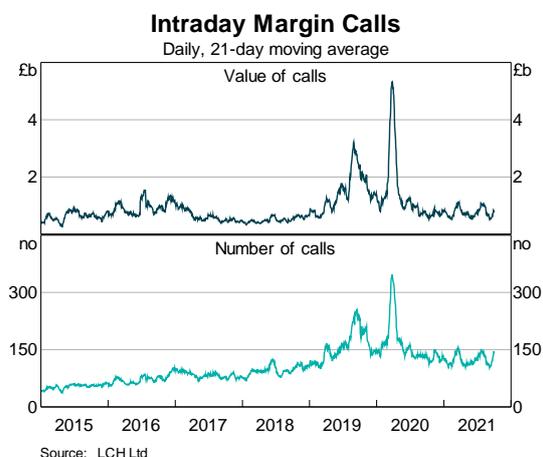
As volatility reverted to more normal levels, the effect of market conditions on IM requirements subsequently decayed, and the initial effect of the IM floor progressively reversed. In more recent months, total IM requirements at SwapClear have settled at a new, higher level largely reflecting the increase in the riskiness of participant portfolios relative to just prior to the pandemic.

Variation margin flows, which prevent the build-up of current exposures as prices move, reverted to around pre-pandemic levels, although there was a slight pick-up in flows in the first quarter of 2021 coinciding with an uptick in market volatility (Graph 7). The number and value of intraday margin calls, which are made when a participants’ margin liabilities exceed a predetermined credit threshold, followed a similar pattern (Graph 8).

Graph 7



Graph 8



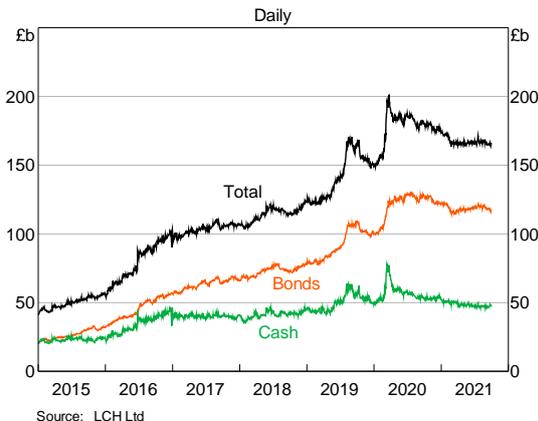
LCH Ltd accepts cash and non-cash collateral in a range of currencies, with collateral eligibility differing between types of margin calls and default fund contributions.⁴ Total collateral held by the SwapClear service decreased from the peak of March 2020 in line with total margin requirements (Graph 9). While LCH Ltd accepts Australian Government Securities and AUD cash as initial margin, AUD collateral accounts for less than 1 per cent of total collateral held. Over 85 per cent of total collateral held is denominated in USD, GBP or EUR.

The Rates service default fund – covering the SwapClear and Listed Rates services – is a pool of mutualised financial resources, prefunded by clearing participants. It is used in the event that a defaulting participant’s own margin and default fund contributions are insufficient to cover losses arising from the default. The Rates service default fund is comprised of a core component and an additional component that is used to facilitate real-time trade registration (Graph 10).

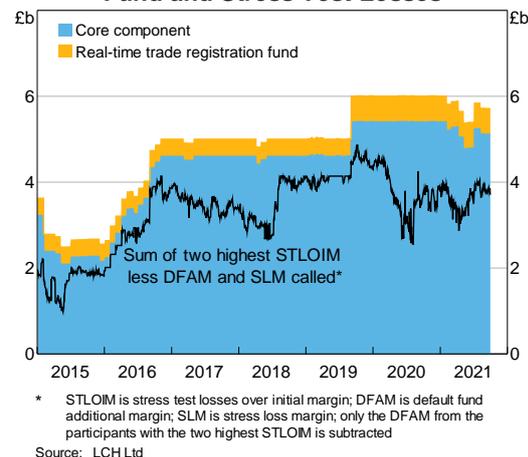
The core component of the default fund is calibrated to cover the sum of the stress test losses over initial margin (STLOIM) of the two clearing participants (including their affiliates and clients) generating the largest expected financial exposure under extreme but plausible conditions.

To prevent a single participant with a large exposure driving up the contribution of other participants, LCH Ltd may call default fund additional margin (DFAM) from participants to offset stress losses in excess of initial margin that would exceed 45 per cent of the default fund. In addition, the default fund is capped at £6 billion. Participants can ask clients to cover their own stress test losses (rather than the participant paying DFAM) through the provision of ‘stress loss margin’.

Graph 9
Total Collateral Held



Graph 10
Rates Service: Default Fund and Stress Test Losses



4 LCH Ltd accepts: GBP cash for default fund contributions, eligible cash and non-cash collateral for initial margin, and eligible cash for intraday margin calls. Variation margin must be met in the currency of the underlying exposure. For further information, see LCH Ltd's website on *LTD Acceptable Collateral*. Available at <<https://www.lch.com/collateral-management/ltd-collateral-management/ltd-acceptable-collateral>>.

4.2 Australian Activity

SwapClear has six Australian-domiciled direct clearing participants – Australia and New Zealand Banking Group Ltd, Commonwealth Bank of Australia, Goldman Sachs Financial Markets Pty Ltd, Macquarie Bank Limited, National Australia Bank Limited, and Westpac Banking Corporation.

The total notional value of Australian participants' interest rate derivatives outstanding (in all currencies) cleared via SwapClear declined by 4 per cent in AUD terms over the year (Graph 11).

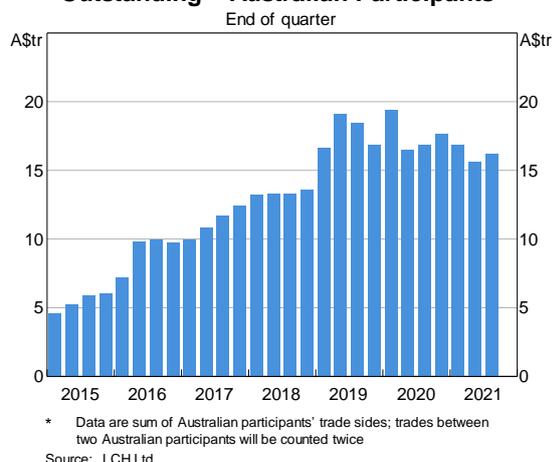
Overall, an estimated 90 per cent of all centrally cleared AUD-denominated OTC interest rate derivatives were cleared via SwapClear. Trading activity in AUD interest rate derivatives broadly mirrored trends in activity across all currencies, although there was a much larger decline in AUD OIS activity in the middle of the year. (Graph 12).

4.3 Operational Performance

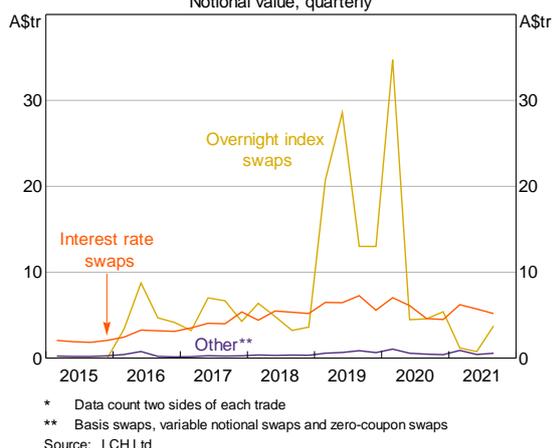
The average number of trades registered at SwapClear was little changed throughout 2021 (Graph 13). LCH Ltd deems its capacity utilisation target to be met if the service has the capacity to handle the greater of either (i) two times current daily peak throughput of trades registered over the previous two years, or (ii) the projected daily average throughput in 12 months' time. The SwapClear service met its target in all months during the assessment period.

LCH Ltd targets IT system availability for the SwapClear service equivalent to at least 99.7 per cent. In effect this means that system outages should last no more than 2 hours in any one calendar month.⁵ This target was met by SwapClear in 11 months of the assessment period (see also section 3.3 - SwapClear operational incident for more details). Overall, IT system availability averaged 99.8 per cent.

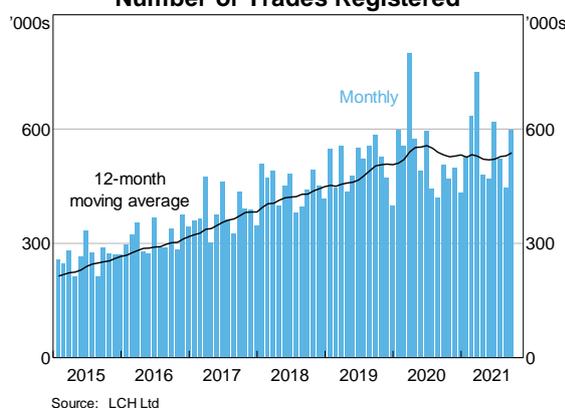
Graph 11
Notional Value
Outstanding – Australian Participants*



Graph 12
AUD Interest Rate Derivatives Registered*
Notional value, quarterly



Graph 13
Number of Trades Registered



5 LCH Ltd weights outages to calculate service availability: a weight of one where there is full service outage; a weight of 0.5 or 0.25 for partial outages, depending on the incident; and a weight of zero for partial losses of resilience, such as when the service is still operating but an additional server used to share the load is unavailable.

Abbreviations

ASIC	Australian Securities and Investments Commission
BoE	Bank of England
CCP	Central counterparty
CCP Standard	Financial Stability Standards for Central Counterparties
CS	Clearing and settlement
DFAM	Default fund additional margin
EMIR	European Market Infrastructure Regulation (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)
EONIA	Euro Overnight Index Average
€STR	Euro short-term rate
FRA	Forward rate agreement
GMT	Greenwich Mean Time
IBOR	Interbank offered rate
IM	Initial margin
IRD	Interest rate derivatives
IRS	Interest rate swaps
ISDA	International Swaps and Derivatives Association
LCH Ltd	LCH Limited
LCH Ltd Global College	Multilateral arrangement for regulatory, supervisory and oversight cooperation on LCH Ltd
LIBOR	London Interbank Offered Rate
OIS	Overnight index swaps
OTC	Over-the-counter
PPS	Protected Payments System
SOFR	Secured Overnight Financing Rate
SORA	Singapore Overnight Rate Average
STLOIM	Stress test loss over initial margin
TONA	Tokyo Overnight Average rate
The Bank	Reserve Bank of Australia
24x5	24 hours, 5 days per week