Assessment of Chicago Mercantile Exchange Inc.

March 2019

Contents

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Executive Summary

Purpose

This report presents the Reserve Bank of Australia's Assessment of Chicago Mercantile Exchange Inc. (CME), which operates in Australia under an overseas clearing and settlement (CS) facility licence. CME is incorporated in the United States, and is primarily regulated by the Commodity Futures Trading Commission (CFTC) under US legislation. CME has been designated in the United States as a Systemically Important Derivatives Clearing Organization (SIDCO), and therefore is also subject to oversight by the Federal Reserve Board of Governors.

Given the nature and scope of CME's current activities in Australia, the Bank has not considered it necessary at this stage to conduct a detailed assessment of CME against all of the *Financial Stability Standards for Central Counterparties* (the CCP Standards). This report covers developments relating to the Bank's Assessment of CME for the 12 months ending 31 December 2018 (the assessment period).

Conclusion

In the assessment period CME has broadly addressed the outstanding regulatory priorities outlined in the Bank's previous Assessment. The Bank also set new regulatory priorities related to the variation of CME's licence.

Progress towards regulatory priorities

During the assessment period CME provided its updated recovery and wind-down plans, which the Bank has now reviewed. Further improvements to the plans and associated rule changes for CME's over-the-counter (OTC) Interest Rate Swap (IRS) clearing service are expected to be implemented during the next assessment period. The Bank also reviewed the independent validation of CME's Liquidity Risk Management Framework (LRMF), and engaged with CME to monitor enhancements to this framework.

Regulatory Developments

During the assessment period, CME applied to vary its CS facility licence to permit clearing of commodity derivatives, energy derivatives and environmental derivatives traded on the market operated by FEX Global Pty Ltd (FEX). The licence was varied on 26 February 2019.

Priorities and supervisory focus

In the coming year the Bank will continue to engage with CME on developments related to the implementation of its recovery and wind-down plans and the LRMF. The Bank will also monitor progress against new regulatory priorities set as part of the licence variation, if the FEX service is launched.

In addition, the Bank will consider the alignment of CME's practices with guidance from the Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO), *Resilience of central counterparties (CCPs): Further guidance on the PFMI* and will continue to expect CME to consider any applicable implications of the CPMI–IOSCO *Guidance on cyber resilience for financial market infrastructures* for its operations.

Developments Relating to the Bank's Assessment

CME is a Chicago-based central counterparty (CCP) that provides clearing services for a number of products from its US operations. CME operates two clearing services: an OTC IRS clearing service; and a 'Base' clearing service.[1] The Base service accounts for the majority of CME's total clearing activity and covers exchange-traded interest rate futures and options on futures, foreign exchange (FX), equity, soft commodity, energy and metal futures, certain OTC FX forwards and options, and commodity swaps. CME maintains separate default resources (i.e. default waterfalls) for each clearing service. Further background on CME's risk management is set out in Appendix B.2.

In Australia, CME holds a CS facility licence which permits it to offer clearing services to Australian-based institutions as direct clearing participants for OTC interest rate derivatives (IRD) and non-Australian dollar-denominated IRD traded on the CME market or the Chicago Board of Trade (CBOT) market, for which CME permits portfolio margining with OTC IRD.[2] CME's Australian CS facility licence was varied on 26 February 2019 to permit CME to provide CS services for commodity, energy and environmental derivatives traded on the financial market operated by FEX Global Pty Ltd (FEX).[3] CME does not currently have any direct Australian-based clearing participants, although Australian firms access CME's clearing services indirectly as clients of direct participants.

Given the nature and scope of CME's current activities in Australia, the Bank has not considered it necessary at this stage to conduct a detailed assessment of CME against all of the CCP Standards. The Bank instead conducts and publishes a narrower assessment, focusing on CME's progress towards addressing key issues. During the assessment period, the Bank continued its ongoing assessment of progress. The Bank also conducted an assessment of CME's application for a licence variation, focusing on arrangements to manage any 'new or novel' risks arising from the extension of CME's clearing service to include the FEX-listed products. Further background on this review and the Bank's findings are set out in Section 2.2.

This section summarises developments during the assessment period in relation to the Bank's outstanding regulatory priorities for CME set out in its March 2018 Assessment and CME's application to vary its CS facility licence.[4] This section also summarises the Bank's priorities and supervisory focus for the next assessment period.

1.1 Progress against Regulatory Priorities and Supervisory Focus

The Bank's previous Assessment set out two regulatory priorities for CME for the year ending December 2018.

1 CME operated an OTC Credit Default Swap (CDS) clearing service which was wound down in March 2018.

2 A copy of the licence is available at <http://download.asic.gov.au/media/2018403/cme-cs-facility-licence-signed-30-september-2014.pdf>. CME also holds an Australian Market Licence.

3 A copy of the CS facility licence variation is available at <https://download.asic.gov.au/media/5024330/cme-variation-signed-26-february-2019.pdf >.

4 See RBA (2018), 'Assessment of Chicago Mercantile Exchange Inc.', March. Available at <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/chicago-mercantile-exchange/2018/pdf/cme-assessment-2018-03.pdf>.

Recovery and Wind-down Plans. CME should complete its work to implement its recovery and wind-down plans for each of its clearing services. The Bank will expect to complete its review of the plans in the 2018 assessment period subject to the updated recovery and wind-down plans being received.

CCP Standards 3 (Framework for the comprehensive management of risks) and 14 (General business risk)

During the assessment period CME provided the Bank with copies of its updated recovery and wind-down plans. The Bank completed a review of these plans against the CCP Standards and the updated CPMI–IOSCO report on *Recovery of financial market infrastructures* (Recovery Guidance).[5] A process is currently underway with CME's home regulators to improve aspects of the plans, including: the applicable stress scenarios; recovery tools and triggers; supporting analysis and documentation; and, more broadly, the governance of recovery and wind-down implementation. The Bank expects that this process will adequately address issues identified in its review.

As noted in the March 2018 Assessment, CME's program to implement the recovery and wind-down plans included changes to the end-of-waterfall rules for the CME Base clearing service introduced in late 2016. During the assessment period CME continued discussions with its home regulator on conforming rule changes for the OTC IRS service. CME has indicated to the Bank that these changes are expected to be implemented in 2019 subject to US regulatory approval.

Given the progress outlined above, the Bank has concluded that, once the improvements and rule changes currently underway are fully implemented, CME will have addressed this regulatory priority. Over the next year the Bank will continue to engage with CME on this topic, including to monitor any material changes introduced.

Liquidity risk. The Bank expects CME to share the reports from the validations that it conducts of its liquidity stress testing model and any further validations of the LRMF, and to engage with the Bank on the results.

CCP Standard 7 (Liquidity risk)

In June 2018, CME provided the Bank with the report from an external validation of its LRMF commissioned in 2017. The report included a review of the completeness, appropriateness and regulatory compliance of the LRMF, as well as a qualitative assessment of the liquidity tool and its implementation (i.e. liquidity stress testing, liquidity stress-test scenarios and the liquidity dashboard).

CME also provided the Bank with a copy of confidential documentation assessing the design and effectiveness of controls for CME's credit and liquidity risk management processes. The documentation concluded that CME's credit and liquidity risk management control environment remained 'adequate' (the highest possible rating).

During the assessment period, the Bank completed a review of the material provided, as well as CME's response to the findings of the external validation. The Bank engaged with CME on the results of its review and will discuss them further during 2019 with CME's home regulator. Over the course of this engagement CME confirmed it had introduced a settlement bank failure event as part of its daily liquidity stress testing. This liquidity-specific stress testing scenario is consistent with the recommendation made by the international guidance formally adopted by the Bank in interpreting the relevant CCP Standards.[6]

5 See CPMI–IOSCO (2017), 'Recovery of financial market infrastructures', July. Available at <http://www.bis.org/cpmi/publ/d162.pdf>.

6 Prior to introducing this liquidity-specific stress testing scenario in its daily liquidity stress testing procedures, CME had been working on monitoring indirect liquidity risks (risks originating from counterparties other than a defaulting clearing participant).

The Bank has concluded that CME has addressed the 2018 regulatory priority relating to liquidity risk. The Bank will continue to engage with CME to monitor ongoing initiatives to improve CME's liquidity risk management arrangements and the testing of those arrangements.

1.1.1 Australian regulatory priorities

CME does not currently have any direct Australian-based clearing participants, and its clearing of Australian dollar-denominated OTC IRD remains relatively low (See Appendix A for further details on activity in CME). The Bank does not therefore expect CME to make substantial progress against regulatory priorities specifically related to the provision of services to the Australian market until CME has material direct Australian participation, or there is a significant increase in CME's provision of services of Australian-related products. This includes developments related to the new clearing service for the FEX market (see below).

1.1.2 Supervisory focus

The focus of the Bank's resources over the period was the review of documentation provided by CME in response to outstanding regulatory priorities and the assessment of CME's application to vary its CS facility licence. The Bank did not progress work on the proposed areas of supervisory focus identified in the March 2018 Assessment related to how CME's practices align with international guidance on financial and cyber resilience. The Bank will carry these areas of supervisory focus forward into the next assessment period.

1.2 CME's Clearing Service for FEX

CME's Australian CS facility licence was varied in February 2019 to permit CME to provide clearing services for commodity derivatives, energy derivatives and environmental derivatives listed for trading on the financial market operated by FEX.[7]

CME proposes to clear positions in futures and options contracts listed on the FEX market within CME's existing Base guaranty fund. CME expects that this service would be accessed indirectly by Australian end users through brokers acting as customers of existing CME clearing participants (i.e. futures commission merchants). The service will be covered by the Base service's risk management arrangements and default resources. CME's existing margin methodology for Base products will be applied to portfolios of FEX products, although CME will establish new intra-day and end-of-day settlement cycles aligned with Australian business hours. At launch, CME will limit the collateral accepted to meet margin requirements on FEX positions to streamline the related operational arrangements.

A high-level assessment of CME against the CCP Standards was conducted by the Bank in September 2014 (the 2014 Assessment), when CME applied for its Australian CS facility licence.[8] In preparing its advice on CME's licence variation application, the Bank revisited those aspects of the 2014 Assessment likely to be impacted by arrangements to manage any new or novel risks arising from the extension of CME's clearing service to include the FEX-listed products.[9]

Overall, the Bank is of the view that the variation of CME's licence to permit it to offer clearing services for FEX-listed products will not impact CME's observance of the CCP Standards. However, the Bank's

7 To accommodate the clearing service for FEX, CME made a number of changes to the CME Rulebook which were submitted to the CFTC via a 10-day self-certification process under Regulation 40.6(a) on 3 July 2018.

8 See RBA (2014), 'Initial Assessment of Chicago Mercantile Exchange Inc. against the Financial Stability Standards for Central Counterparties', September. Available at <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/chicago-mercantile-exchange/2014/pdf/cme-assess-2014-09.pdf>.

9 The Bank's assessment focussed on relevant aspects of CCP Standards 1, 2, 3, 4, 5, 6, 7, 8, 9, 12, 13, 15, 16, 17, 18 and 21.

analysis identified three areas, specific to the FEX service, in which the Bank expects CME to conduct further work to ensure ongoing observance of the CCP Standards. The Bank has set out three new regulatory priorities addressing these areas, outlined below.

1.3 Supervisory Focus and New Regulatory Priorities

1.3.1 Supervisory Focus

In the coming period the Bank will maintain a supervisory focus of monitoring how CME's practices align with recent guidance from CPMI–IOSCO in relation to resilience. This guidance is applicable to all CCPs, and the Bank expects Australian-licensed CCPs, including CME, to align their arrangements and practices with it. The Bank also continues to expect CME to consider any applicable implications of the CPMI–IOSCO *Guidance on cyber resilience for financial market infrastructures* for its operations.

1.3.2 New regulatory priorities

The Bank expects to monitor CME's progress against three new regulatory prorities as the clearing service for FEX develops.

Margin arrangements and close-out period

The Bank's assessment of CME's licence variation application gave careful consideration to CME's proposed close-out period for FEX products, its margining arrangements more broadly, the liquidity characteristics of proposed contracts, as well as CME's approach to participant default management, portfolio auctioning and porting of customer positions. CME's margining arrangements for FEX products, as for its Base products more broadly, assume that customer positions would be closed out within one day, likely through an auction process. At launch, however, this close-out assumption will effectively be extended by up to an additional day through an add-on reflecting liquidity considerations at the product level.

The Bank focused on the importance of a CCP's ability to close out, or successfully port, cleared portfolios in a timely manner, while limiting losses to the CCP and its participants. The Bank expects to review CME's default management drills which should include client positions and positions in FEX products, to ensure CME continues to demonstrate its ability to close out (or port) these positions in a timely manner.

Close-out period. CME must test the closing out of a hypothetical defaulted portfolio of FEX positions in a default management drill within the first twelve months following the commencement of trading on the FEX market. Thereafter, positions in FEX products will be included in default management drills at a minimum once every two years.

CME must also test porting and/or closing out of client positions on a regular basis as part of its default management drills.

The Bank will review the results of these drills.

CCP Standards 6 (Margin), 12 (Participant default rules and procedures) and 13 (Segregation and portability)

Australian dollar liquidity arrangements

CME is not currently in a position to source Australian dollar liquidity through its existing pre-arranged facilities during Australian business hours. As a result, at launch, CME will limit acceptable collateral to meet initial margin requirements for Australian dollar-settled FEX contracts to Australian dollar cash.

The Bank expects CME will arrange access to pre-arranged liquidity resources during Australian business hours prior to extending its list of eligible collateral for Australian dollar-settled FEX products.

Australian dollar liquidity arrangements. CME must establish adequate liquidity arrangements for Australian dollar collateral during Australian hours before introducing any type of eligible collateral for Australian dollar-settled FEX products other than Australian dollar cash.

CCP Standards 5 (Collateral) and 7 (Liquidity)

Australian dollar settlement bank arrangements

CME has established arrangements with one settlement bank to offer services for the new FEX settlement cycles at launch. CME indicated it would seek to organise additional settlement bank arrangements after launch, should the FEX service grow. In addition, CME noted it has existing arrangements with a number of settlement banks which are available for Australian dollar-denominated transactions during CME's main settlement cycles.

The Bank expects that CME will minimise settlement exposures by introducing further settlement arrangements for the FEX service, conditional upon the use of CME's clearing services for FEX products.

Australian dollar settlement bank arrangements. Should the FEX service grow, CME must ensure the settlement arrangements in place to support money settlements for the FEX clearing service remain appropriate, including adequate back-up arrangements. CME must share its assessments of these arrangements with the Bank for review.

CCP Standards 8 (Settlement finality) and 9 (Money settlements)

1.3.3 Australian regulatory priorities

In the event that CME has material direct Australian participation, or should there be a significant increase in CME's provision of services in Australian-related products, consistent with the expectations set out in the Council of Financial Regulators (CFR) policy on *Ensuring Appropriate Influence for Australian Regulators over Cross-border Clearing and Settlement Facilities* (July 2012), the Bank will expect that CME should:

- ensure that Australian representation in governance arrangements appropriately reflects the scale and nature of Australian participation
- ensure that local market practices are appropriately accommodated
- ensure that there is appropriate representation of Australian membership and regulators in default management
- provide adequate operational support arrangements to Australian participants, particularly during Australian market hours.

1.4 Other Regulatory Developments

CPMI–IOSCO implementation monitoring

In May 2018, CPMI and IOSCO published a report reviewing CCPs' progress in implementing the *Principles for Financial Market Infrastructures* (PFMI) with respect to their financial risk management and recovery practices.[10] The report focuses on CCPs' progress in addressing the most serious issues of concern identified in an initial report published in 2016. This initial review included the results of a peer review examining consistency in the outcomes of CCPs' implementation of the PFMI, covering 10 CCPs internationally that provide clearing services for derivatives, including CME.[11] The follow-up assessment extended the scope to cover 19 CCPs that provide clearing services to a broader range of product classes, such as clearing services provided in the repo, bond and equity markets, as well as derivatives.

The Bank participated in this follow-up review and it expects to continue engaging CME on relevant findings in the next assessment period.

10 See CPMI–IOSCO (2018), 'Implementation monitoring of PFMI: follow-up Level 3 assessment of CCPs' recovery planning, coverage of financial resources and liquidity stress testing', May. Available at <https://www.bis.org/cpmi/publ/d177.pdf>.

11 See CPMI–IOSCO (2016), 'Implementation monitoring of PFMI: Level 3 assessment – Report on the financial risk management and recovery practices of 10 derivatives CCPs', August. Available at <http://www.bis.org/cpmi/publ/d148.pdf>.

Appendix A: Activity in CME

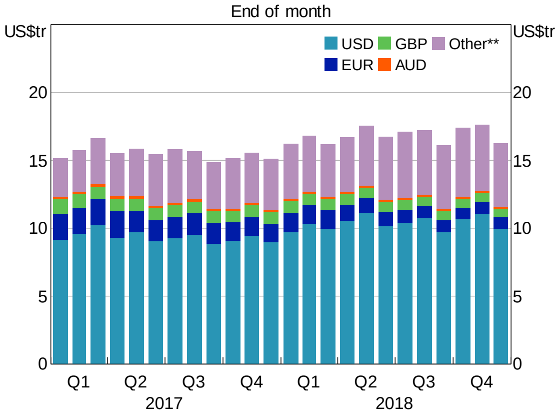
A.1 OTC IRD

CME clears OTC IRD denominated in 24 different currencies, including Australian dollars. OTC IRD denominated in Chilean peso, Colombian peso, and Chinese yuan were added to CME's clearing service during the assessment period. The notional value of cleared OTC IRD transactions outstanding with CME was US$16.2 trillion at end December 2018 (Graph 1), higher than end December 2017. US dollar-denominated OTC IRD accounted for around 69 per cent of OTC IRD transactions cleared by CME in 2018. On average, over the assessment period, less than 1 per cent of the total notional value of OTC IRD outstanding with CME was denominated in Australian dollars. CME conducted trade compression runs for US dollar, euro, Mexican peso and Brazilian real-denominated OTC IRD contracts over the assessment period. Compression runs reduce the notional value of trades outstanding.

Graph 1

OTC IRD: Notional Value of Trades Outstanding, by Currency (Stock)*

End of month



* Data counts one side of each trade; CME regularly conducts TriOptima compression runs

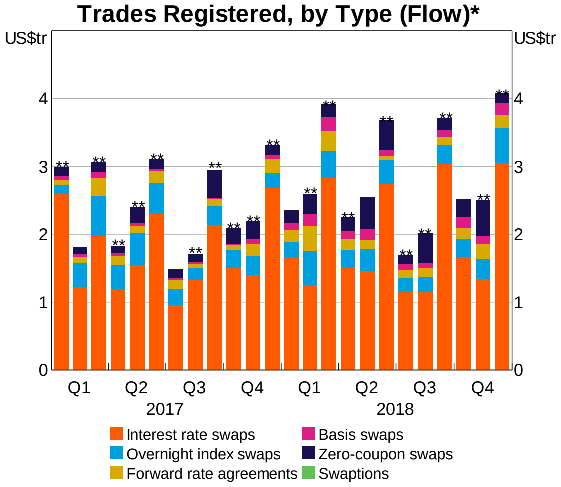
** Includes BRL, CAD, CHF, CLP, CNY, COP, CZK, DKK, HKD, HUF, INR, JPY, KRW, MXN, NOK, NZD, PLN, SEK, SGD, ZAR

Source: CME

CME clears six types of OTC IRD: IRS, zero-coupon swaps, basis swaps, forward rate agreements, overnight index swaps (OIS) and swaptions. CME expanded its clearing service to include Australian dollar-denominated OIS in 2016. Graph 2 and Graph 3 depict, respectively, notional value registered and notional value outstanding in CME's OTC IRS clearing service by product type. IRS constitute the largest component of the outstanding value of open trades.

Graph 2

OTC IRD: Notional Value of Trades Registered, by Type (Flow)*



* Data counts one side of each trade

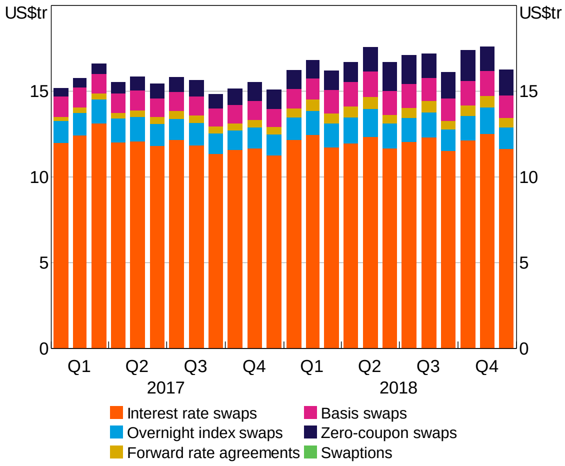
** CME conducted a TriOptima compression run in this month; compression runs increase the notional value of trades registered in the affected month

Source: CME

Graph 3

OTC IRD: Notional Value of Trades Outstanding, by Type (Stock)*

End of month



* Data counts one side of each trade; CME regularly conducts TriOptima compression runs

Source: CME

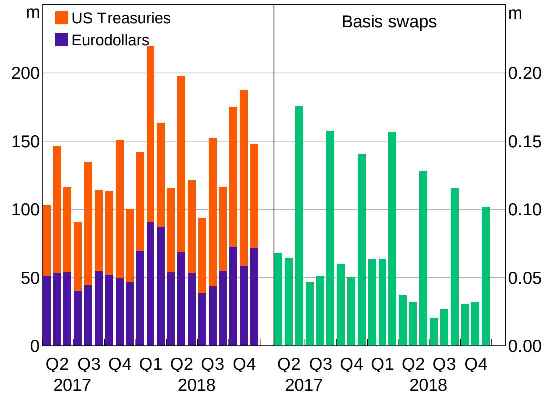
A.2 Exchange-traded Derivatives

As noted above, CME clears a range of exchange-traded derivatives through its Base service. CME is licensed in Australia to offer direct clearing services for a subset of these products: non-Australian dollar-denominated IRD traded on the CME market or the CBOT exchange for which CME permits portfolio margining with OTC IRD – currently, this includes US Treasury futures, Fed Fund futures and US deliverable swap futures traded on the CBOT exchange, and Eurodollar futures traded on the CME exchange.[12]

The number of trades registered and outstanding in these products, by product type, is depicted in Graph 4 and Graph 5, respectively.

Graph 4

Futures: Number of Trades Registered, by Type (Flow)*

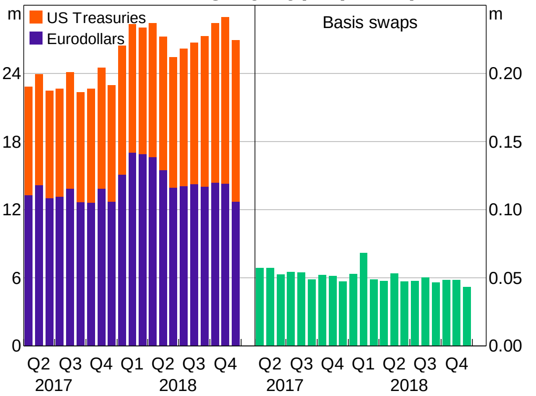


* Only includes Base products that are eligible for portfolio margining; data counts one side of each trade

Source: CME

Graph 5

Futures: Number of Trades Outstanding, by Type (Stock)*



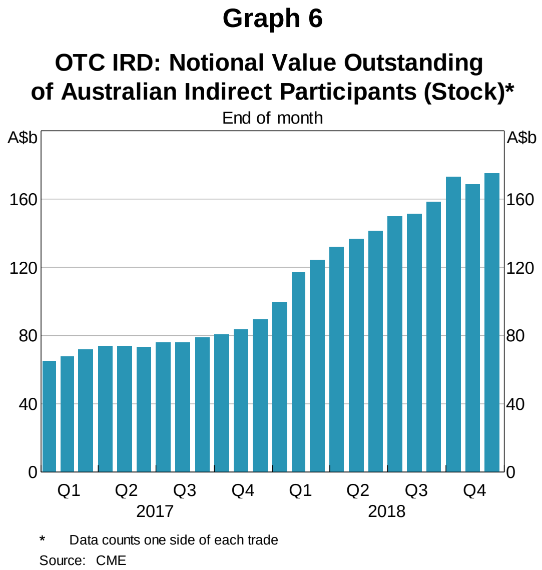
* Only includes Base products that are eligible for portfolio margining; data counts one side of each trade

Source: CME

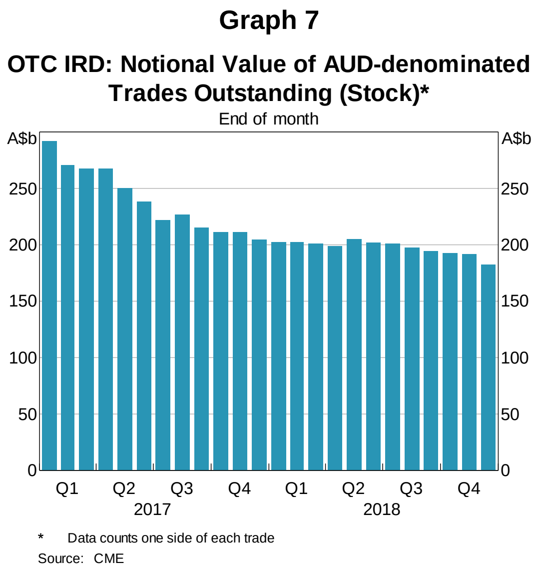
12 Portfolio margining is where margin calculations are made at the portfolio level rather than at the product level, allowing for reduced margin requirements to the extent that there are offsetting open positions across the portfolio of products.

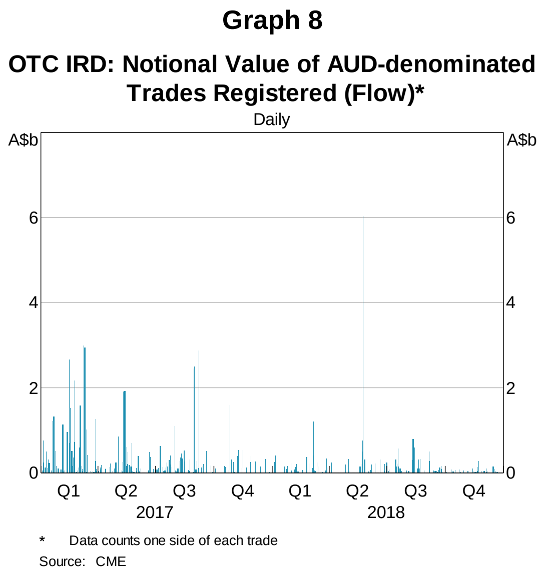
A.3 Australian Activity

CME does not currently have any direct Australian clearing participants. However, a number of Australian-based banks, superannuation funds and other institutional investors clear OTC IRD products indirectly through CME, as clients of direct clearing participants. At end December 2018, the notional value outstanding of indirect Australian participants' OTC IRD trades in all currencies was around A$175 billion (Graph 6).



Graph 7 and Graph 8 depict the notional value of Australian dollar-denominated OTC IRD trades outstanding and registered with CME. At end December 2018, CME had around A$182 billion notional value of Australian dollar-denominated OTC IRD trades outstanding.[13] This represents around 1.5 per cent of the notional value outstanding of all centrally cleared Australian dollar-denominated OTC IRD trades (around A$12 trillion at end December 2018).[14]





13 This figure counts one side of each trade.

14 This is as a proportion of total Australian dollar-denominated OTC IRD trades cleared at ASX Clear (Futures), CME Inc. and LCH Limited's SwapClear service. These figures count one side of each trade.

Appendix B: CME Regulatory Environment and Risk Management

B.1 Regulatory Framework

CME is incorporated in the United States and is primarily regulated by the CFTC under US legislation. As a designated SIDCO, CME is also subject to oversight by the Federal Reserve Board of Governors.

CME is licensed in Australia under section 824B(2) of the *Corporations Act 2001*, which provides licensing 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. The regulatory regime in the United States, as administered by the CFTC, is considered to be sufficiently equivalent to that in Australia.[15] The Bank and the Australian Securities and Investments Commission (ASIC) have established a joint Memorandum of Understanding (MoU) with the CFTC regarding supervision of CCPs that operate in both the United States and Australia.[16] The MoU provides a framework for cooperation among the authorities, including information sharing and investigative assistance.

CME is recognised as a third-country CCP by the European Securities and Markets Authority (ESMA) under 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 the European Market Infrastructure Regulation (EMIR)). CME is also authorised to provide clearing services in Japan, Singapore, Hong Kong, Mexico and Switzerland. The Dubai Financial Services Authority (DFSA) has authorised CME as a Recognised Body. CME provides clearing services to Dubai Mercantile Exchange Limited (DME).

CME is exempt from the requirement to register as a clearing agency in Alberta, Ontario and Québec.

A CME crisis management group led by the CFTC and the Federal Deposit Insurance Corporation (FDIC) was established in 2017, consistent with a recommendation by the Financial Stability Board (FSB) in its report: *Key Attributes of Effective Resolution Regimes for Financial Institutions*.[17] The purpose of this group is to coordinate with respect to resolution planning. The Bank is not a member of this group.

B.2 Risk Management in CME

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

15 More detail on the supervisory approach of the CFTC is available in the Bank's March 2016 Assessment. Available at <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/chicago-mercantile-exchange/2016/pdf/cme-assessment-2016-03.pdf>.

16 The MoU is available at <https://www.rba.gov.au/payments-and-infrastructure/payments-system-regulation/pdf/memorandum-20140606.pdf>.

17 See Financial Stability Board (2014), 'Key Attributes of Effective Resolution Regimes for Financial Institutions', October. Available at <http://www.fsb.org/wp-content/uploads/r_141015.pdf>.

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.

CME manages this risk in a number of ways, including through participation requirements, margin collection, the maintenance of pooled resources, and loss allocation arrangements.

B.2.1 Clearing participation requirements

To manage its exposure to its participants, CME only allows institutions to become clearing participants (referred to as 'clearing members' in the *CME Rulebook*) if they meet certain financial and operational requirements. Prospective clearing participants are required to meet minimum capital requirements. These requirements are set at: US$50 million for OTC IRS clearing participants; and US$5 billion or US$5 million for Base clearing participants that clear exchange-traded products only, depending on whether the participant is a bank or non-bank.[18] Prospective participants must also satisfy a number of other requirements, including operational and technological capabilities, and disaster recovery and business continuity arrangements. Once accepted, clearing participants must meet minimum guaranty fund contributions, set at US$0.5 million for Base clearing participants (US$2.5 million for those clearing OTC-traded Base products) and US$15 million for OTC IRS clearing participants. CME also maintains the right to impose additional requirements on clearing participants specific to the type of entity or products they propose to clear.

B.2.2 Margin collection

To cover its credit exposures, CME collects several types of margin from its clearing participants:

- *Variation margin*. CME collects and pays out 'settlement variation' margin (which corresponds to variation margin as defined in the CCP Standards) for all cleared products. Variation margin is calculated to cover gains or losses on positions arising from observed price movements. This practice ensures that losses on CME participants' positions do not accrue over time. Variation margin is called twice a day for Base products (once for OTC FX products) and once a day for OTC IRS. As part of the new settlement cycle established for FEX products, variation margin will be called once a day until activity exceeds certain *de minimis* thresholds.

- *Initial margin*. In the event of a clearing participant default, CME would be exposed to risk arising from potential changes in the market value of the defaulting participant's open position between the last settlement of variation margin and the close-out of these positions. To mitigate this risk, CME collects 'performance bonds' (which corresponds to initial margin as defined in the CCP Standards) for all cleared products. Initial margin is called twice a day for Base products (once for OTC FX products) and once a day for OTC IRS. As part of the new settlement cycle established for FEX products, initial margin will be called once a day until activity exceeds certain *de minimis* thresholds. Consistent with CFTC Regulations, CME requires clearing participants to deposit gross initial margin for customer accounts, but allows net initial margin deposits for house positions. Clearing participants are required by CME and applicable CFTC Regulations to collect at least as much initial margin from each customer as CME collects from the clearing participants and to lodge this minimum amount with CME. CME requires clearing participants with speculative customer accounts to collect a higher level of margin from these accounts.[19]

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18 Participants in the Base service that clear OTC-traded Base products, regardless of the type of entity, must have at least US$50 million in capital (US$5 million if only clearing agricultural OTC products). Banks that clear OTC-traded Base products as well as exchange-traded derivatives must meet the higher capital requirement of US$5 billion.

19 In addition to maintenance performance margin, CME also sets 'minimum initial margin', which is applied only to speculative customer accounts that are cleared through a clearing participant. Customers who are charged minimum

- *Intraday margin*. CME may also collect intraday margin, in addition to routine margin calls, throughout a trading session in situations it deems appropriate, such as in the event of significant market movements. CME made no ad hoc intraday margin calls over the assessment period. The last ad hoc intraday margin call for the OTC IRS service was made in response to market movements on the day after the UK referendum on EU membership on 24 June 2016.

- *Additional margin*. CME may also collect additional margin from clearing participants in the form of 'concentration margin'. Concentration margin is intended to cover potential market exposures due to a clearing participant holding positions that take longer or are more costly to liquidate, and provides an additional incentive for clearing participants to manage and contain the risk of their portfolios. For Base products, concentration margin can be applied if the results of stress tests exceed either a pre-defined absolute threshold or a capital threshold.[20] In 2018, to reduce variability in concentration margin calculations, CME removed the requirement that the stress-test loss also exceeds a participant's variation margin pays threshold (an average of the two highest variation margin pays over the previous 12 months). For OTC IRS, CME may apply a concentration margin in the form of a liquidity charge multiplier. CME routinely calls concentration margin from clearing participants.

- *Stress shortfall margin* (Base products only). As part of its daily stress testing process, CME calculates 'portfolio residual losses', which are stress test losses in excess of total collateral posted by the clearing participant.[21] During the assessment period, CME introduced a new policy to apply a margin add-on increasing the share of resources contributed by participants with large directional exposures, rather than mutualising the entire residual loss in the guaranty fund. Participants whose shortfalls exceed US$1 billion are now required to post margin equal to 30 per cent of the amount in excess of this threshold.

CME calculates initial margin requirements for OTC IRS products using an Historical Value at Risk (HVaR) methodology, with historical returns scaled using exponentially-weighted moving-average volatility. To provide a set of historical scenarios CME uses a rolling look-back period of five years, in addition to including stressed periods such as the global financial crisis period of 2008–09. CME targets an *ex post* coverage of 99 per cent assuming a close-out period of five days. CME also has a volatility floor to protect against procyclicality.

Initial margin requirements for Base products are calculated using the CME SPAN methodology. This methodology calculates initial margin that reflects the total risk of each portfolio based on, but not limited to, historical price changes and volatility. CME calibrates initial margin requirements for Base products to cover 99 per cent of forecast price moves for a position over a minimum close-out period of one trading day. Base products that are portfolio-margined with OTC IRS positions are HVaR margined and so are subject to a five-day close-out period.

During the assessment period, CME informed the Bank that it is seeking regulatory approval for a new SPAN methodology which it expects to roll out, in the first instance, for some major energy derivative products in late 2019 or in 2020.

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initial margin are required to deposit this amount with their clearing participant. The clearing participant is, in turn, responsible for depositing the maintenance performance margin portion with CME. The level of these minimum initial requirements is based on the risk characteristics of each product and is set at least 10 per cent higher than the maintenance performance margin level. If the customer's total margin holdings fall below the maintenance performance level, they will be re-margined at the higher minimum initial margin level.

20 For non-bank clearing participants, capital is defined as adjusted net capital and calculated in accordance with CFTC regulations. For bank clearing participants, capital is defined as Tier 1 Capital, which is defined in accordance with regulations applicable to the bank clearing participant.

21 Total collateral posted by the clearing participant includes collateral posted to meet initial margin requirements, additional margin requirements and any excess collateral posted by the clearing participant.

CME assesses the adequacy of its margin models through daily and monthly back-testing. CME also conducts sensitivity analysis on a monthly basis to assess the adequacy of its margin models.

B.2.3 Pooled financial resources

CME has separate default waterfalls (which CME calls 'financial safeguards packages') for its OTC IRS clearing service and its Base clearing service, which determine the order in which financial resources would be used to cover default losses within each of the services.

Each waterfall is segregated from the other, ensuring that clearing participants are only liable for losses associated with a default within the services in which they participate. In the event of a clearing participant default, any losses arising would first be covered by the assets of the defaulted clearing participant, including its margin, contribution to guaranty fund(s) and any other of its assets that are available to CME. If the assets of the defaulted clearing participant are exhausted, CME may draw on other resources in the relevant default waterfall to meet remaining obligations.

Pre-funded resources

In the event that all of the defaulted clearing participant's margin, contribution to guaranty fund(s) and any other assets available to CME are exhausted, CME would seek to cover the remaining losses arising from the default with a pool of pre-funded mutualised resources, which comprise CME's capital contributions and the guaranty fund contributions of non-defaulting clearing participants for the relevant service. CME would use its capital contributions (US$100 million for Base and US$150 million for OTC IRS, as at 31 December 2018) before allocating losses to the guaranty fund contributions of non-defaulting clearing participants. All clearing participants are required to contribute to the guaranty fund of each service in which they participate.

The Base and OTC IRS clearing service guaranty funds are each sized to cover the default of the two clearing participants and their affiliates that would give rise to the largest credit exposure to CME under a wide range of extreme but plausible scenarios, as determined by stress testing (the 'Cover 2' requirement). As at end December 2018, the sizes of the Base and OTC IRS guaranty funds were US$4.1 billion and US$3.32 billion, respectively. The value of each fund is set equal to the greater of: the Cover 2 stress exposure on the last day of the calculation period; or the average of the Cover 2 stress exposures during the entire calculation period. CME also adds a buffer to the guaranty funds, to account for potential increases in the exposures of participants between scheduled resizing dates. The scheduled calculation period is one month for both the Base and OTC IRS guaranty funds. When sizing the Base guaranty fund, CME considers the sum of the two highest stressed exposures from the same stress scenario. When sizing the OTC IRS guaranty fund, CME considers the sum of the two highest stressed exposures, irrespective of stress scenario.

The adequacy of the guaranty funds is assessed by CME on a daily basis through stress testing. In the event that CME assesses that the value of the guaranty fund is insufficient, it has the ability under its rules to resize the guaranty fund and call additional guaranty fund contributions from all clearing participants outside of the scheduled recalculation dates. A review of the guaranty fund would be prompted if the Cover 2 requirement was greater than 80 per cent of the guaranty fund size. The decision to resize the guaranty fund is discretionary and would be made by the Stress Testing Committee within 24 hours, taking into account how close the next scheduled resizing date is and how close the Cover 2 requirement has come to CME's pre-funded resources. In situations where one clearing participant is driving the increase in the Cover 2 requirement, CME may choose to call additional margin from that clearing participant. During the assessment period, CME did not perform any off-cycle resizings of the OTC IRS guaranty fund. However, CME performed off-cycle resizings of its Base guaranty fund on 10 and 18 January. Over the period CME reported one Cover 2 stress test breach for its Base service; the projected shortfall was covered by additional margin collected the next day. The new stress shortfall margin add-on has been introduced to provide a buffer to reduce variability in the sizing of the Base guaranty fund.

Unfunded resources and loss allocation rules

In very extreme circumstances it is possible that CME's pool of pre-funded mutualised resources for the relevant clearing service could be used or even exhausted. In these circumstances, CME is able to call for additional resources from non-defaulting clearing participants using its 'assessment powers' to replenish the relevant guaranty fund or to allocate losses beyond the available pre-funded resources.

Calls for additional resources to allocate losses are due to be paid to CME on the day they are called.[22] In the event that the guaranty fund was drawn on to meet losses arising from a clearing participant default, each non-defaulting clearing participant would be required to replenish its guaranty fund contributions by close of business on the business day following the assessment call.

These payments are subject to participants' maximum obligations during the relevant 'cooling off period'.[23] For the Base guaranty fund, the maximum amount CME can call can vary, depending on how many clearing participants have defaulted. If only one clearing participant defaults, the maximum amount is 2.75 times each clearing participant's Base guaranty fund contribution. If multiple clearing participants default within a five-business-day period (the Base cooling off period), the maximum amount CME can call is 5.5 times each clearing participant's Base guaranty fund contribution. Subject to these limits, CME would call for the required amount of additional resources from each non-defaulting clearing participant in proportion to that participant's contribution to the Base guaranty fund. For the OTC IRS guaranty fund, the maximum amount is sized to cover potential losses arising in the event of the default of the clearing participants with the third and fourth largest stress test losses. Subject to this limit, CME would call for additional resources from each non-defaulting clearing participant based on the relative size of that participant's stress testing result. After the cooling off period, clearing participants must fully replenish their guaranty fund contributions.

CME would implement its recovery plan when it utilises financial resources resulting from assessments. CME's recovery and wind-down plans have been developed in accordance with CFTC Regulations. The recovery plan outlines the tools available to address uncovered credit losses, liquidity shortfalls, or other business risks that could threaten CME's viability as a going concern. In late 2016, CME implemented rule changes to add voluntary contributions, voluntary tear-ups, and mandatory portfolio gains haircuts and partial tear-ups and full tear-ups as recovery tools for the Base service, in the event that a clearing participant default(s) exceeds CME's pre-funded resources and assessment powers. For its OTC IRS service, CME would implement one round of variation margin gains haircutting in conjunction with a full tear-up of contracts.[24] CME has indicated to the Bank that end of waterfall rule changes for its OTC IRS service are expected to be implemented in 2019.

22 However, if the call for additional resources is made within an hour of the close of Fedwire, then these are due to be paid to CME within one hour of when Fedwire next opens.

23 The cooling off period limits a clearing participant's maximum obligation to contribute to the guaranty fund and to fund losses, and lasts for a predetermined number of days following the default of a clearing participant. The cooling off period for the Base guaranty fund is five business days and for the OTC IRS guaranty fund is 25 business days. CME uses a more conservative approach when sizing the OTC IRS guaranty fund due to the longer cooling off period for OTC IRS.

24 CME's Rule 8G802.B permits it to use variation margin gains haircutting in an OTC IRS 'termination event' (i.e. in the event of bankruptcy of CME Inc.), at which time all OTC IRS contacts shall be closed. The *CME Rulebook* is available at: <http://www.cmegroup.com/rulebook/CME/>.

Abbreviations

ASIC	Australian Securities and Investments Commission
CBOT	Chicago Board of Trade
CCP	Central counterparty
CCP Standards	Financial Stability Standards for Central Counterparties
CDS	Credit default swap
CFR	Council of Financial Regulators
CFTC	Commodity Futures Trading Commission
CME	Chicago Mercantile Exchange Inc.
CPMI	Committee on Payments and Market Infrastructures
CS	Clearing and settlement
DFSA	Dubai Financial Services Authority
DME	Dubai Mercantile Exchange Limited
EMIR	European Regulation on OTC derivatives, central counterparties and trade repositories
ESMA	European Securities and Markets Authority
FDIC	Federal Deposit Insurance Corporation
FEX	FEX Global Pty Ltd
FSB	Financial Stability Board
FX	Foreign exchange
HVaR	Historical Value at Risk
IOSCO	International Organization of Securities Commissions
IRD	Interest rate derivatives
IRS	Interest rate swap
LRMF	Liquidity Risk Management Framework
MoU	Memorandum of Understanding
OIS	Overnight index swaps
OTC	Over-the-counter
PFMI	Principles for Financial Market Infrastructures
SIDCO	Systemically Important Derivatives Clearing Organization
SPAN	Standard Portfolio Analysis of Risk