# Assessment of Chicago Mercantile Exchange Inc.

**March 2017**

## 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 (US), and is primarily regulated by the Commodity Futures Trading Commission (CFTC) under US legislation. As a Systemically Important Derivatives Clearing Organization (SIDCO), CME 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 does not consider 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 CME's progress against the regulatory priorities the Bank has set for it. The report covers the 12 months ending 31 December 2016 (the assessment period).

***Conclusion***

In the assessment period CME has either met or made progress towards meeting the regulatory priorities identified by the Bank in its previous Assessment.

***Progress towards 2016 Priorities***

In line with the Bank's regulatory priority, CME has developed or enhanced its recovery and wind-down plans for each of its clearing services. The associated rule changes were implemented during the assessment period.

CME has also worked towards expanding the number of investment counterparties it has, including opening accounts at central banks. This is expected to allow CME to address the Bank's priority of reducing the size and concentration of unsecured investments of cash collateral with non-government obligors.

Furthermore, CME has implemented enhancements to its governance arrangements, introducing board-level approval of key risk management frameworks. These changes go towards addressing a number of the Bank's priorities.

With respect to the Bank's other regulatory priorities, CME has engaged with the Bank and provided the necessary data to allow the Bank to monitor these priorities.

***Other Material Developments***

During the assessment period, CME was granted recognition as a third-country central counterparty (CCP) by the European Securities and Markets Authority (ESMA). CME was also authorised in Japan, Singapore, Hong Kong and Mexico.

***Supervisory Focus for 2017***

In the coming year the Bank's supervisory focus will be to assess the outcome of the work planned or underway at CME, which is expected to fully address the Bank's earlier priorities.

The Bank also expects CME to consider any implications of *Guidance on Cyber Resilience for Financial Market Infrastructures* (the Cyber Resilience Guidance) recently finalised by the Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO).

Similarly, the Bank expects CME to consider any implications of the CPMI-IOSCO *Guidance on Resilience and Recovery of Central Counterparties* (the CCP Resilience and Recovery Guidance) once it is finalised.

# 1. Regulatory Priorities

CME is a Chicago-based CCP that provides clearing services for a number of products from its US operations.[1] CME operates three clearing services: an over-the-counter (OTC) Interest Rate Swap (IRS) clearing service; a 'Base' clearing service; and an OTC Credit Default Swap (CDS) clearing service. 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, and certain OTC FX forwards 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]

Given the nature and scope of CME's current activities in Australia, the Bank does not consider 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 annual assessment, focusing on CME's progress towards addressing key issues.

This section summarises actions taken by CME over 2016 to meet the Bank's regulatory priorities set out in the *2014/15 Assessment of Chicago Mercantile Exchange Inc.* that was published in March 2016 (the March 2016 Assessment). This section also summarises the Bank's supervisory focus for the 2017 assessment period.

## 1.1 Progress against 2016 Regulatory Priorities

CME was granted a CS facility licence in September 2014. In assessing CME's licence application, the Bank conducted an initial assessment of CME's observance of the CCP Standards.[3] As part of this, the Bank determined a set of initial regulatory priorities for CME, reflecting expectations set out in the CCP Standards and 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).[4]

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1 CME Group also operates a separate European clearing house, CME Clearing Europe Limited. CME and CME Clearing Europe Limited are legally separate entities; each CCP is separately capitalised and operates its own guaranty funds.

2 The scope of CME's CS facility licence covers its Base clearing service and its OTC IRS clearing service (which encompasses all OTC IRD products). CME's CS facility licence does not permit it to offer CDS clearing in Australia and this Assessment therefore does not cover CME's CDS service.

3 See RBA (2014), 'Initial Assessment of Chicago Mercantile Exchange Inc. against the Financial Stability Standards for Central Counterparties', September. Available at <http://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>.

4 The CFR Regulatory Influence Policy sets out a graduated framework that imposes additional requirements on cross border facilities proportional to the facility's activities in the Australian financial system. Available at <http://www.treasury.gov.au/ConsultationsandReviews/Consultations/2012/cross-border-clearing>.

The Bank's 2016 regulatory priorities for CME, set out in the March 2016 Assessment, effectively carried over the Bank's initial regulatory priorities for CME.[5] Four of these priorities relate specifically to the provision of services to the Australian market, to ensure that CME's governance and operational arrangements promote stability in the Australian financial system. CME does not yet have any direct Australian-based clearing participants, and its clearing of Australian dollar-denominated OTC IRD remains relatively low. The Bank therefore has not expected that CME should make substantial progress against regulatory priorities specifically related to the provision of services to the Australian market over the assessment period. The remaining regulatory priorities are areas in which the Bank considers that CME should, as a matter of priority, make changes to its policies or make further progress on work that is already ongoing, in order to enhance its observance of the CCP Standards.

These priorities, and CME's progress towards them, are summarised in Table 1 and discussed in more detail in section 2.

**Table 1: Progress against CME Regulatory Priorities Set for 2016**

| Standard | Priority | Comment |
| --- | --- | --- |
| *Regulatory Priorities Specifically Related to CME's Provision of Services to the Australian Market* | | |
| 2. Governance | The Bank expects CME to ensure that Australian representation in governance arrangements appropriately reflects the scale and nature of Australian participation. | *On hold.*<br>The Bank will engage with CME on these priorities in the event that there is material direct Australian participation in CME, or should there be a significant increase in CME's provision of services in Australian-related products. |
| 5.Collateral<br>6. Margin | The Bank expects CME to ensure that local market practices are appropriately accommodated. | |
| 12. Participant default rules and procedures | The Bank expects CME to ensure that there is appropriate representation of Australian membership and regulators in default management. | |
| 16. Operational risk | The Bank expects CME to provide adequate operational support arrangements to Australian participants, particularly during Australian market hours. | |
| *General Regulatory Priorities* | | |
| 3. Framework for the comprehensive management of risks<br>14. General business risk | CME should complete its work to implement its recovery and wind-down plans. The Bank will expect to conduct a review of these plans once this work has been completed, and to engage with CME regarding how its recovery and wind-down plans meet the requirements of the CCP Standards and the guidance on recovery planning set out by CPMI-IOSCO. | *Mostly addressed. Expected to be fully addressed in 2017.*<br>CME has developed or enhanced its recovery and wind-down plans for each of its clearing services. Rule changes for the Base clearing service were implemented at the end of the assessment period. In 2017, CME will, where applicable, make conforming changes to the end of waterfall rules for its OTC IRS and CDS services. |
| 2. Governance<br>4. Credit risk<br>6. Margin<br>7. Liquidity risk | The Bank expects CME to share the reports from the validations that it finalises during the next assessment period and to engage with the Bank on the results. The Bank will monitor CME's application and the ongoing adequacy of the Model Validation Framework, including the governance process. | *Fully addressed.*<br>CME completed validations for the Standard Portfolio Analysis of Risk (SPAN) and Collateral Haircut Model during the assessment period and CME has shared these reports with the Bank.<br>CME has also updated its governance arrangements, introducing board-level approval of the Model Validation Framework on an annual basis and of all substantive changes. |

5 See RBA (2016), '2014/15 Assessment of Chicago Mercantile Exchange Inc.', March. Available at <http://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>.

| Standard | Priority | Comment |
|---|---|---|
| 5. Collateral | The Bank will continue to monitor CME's acceptance of letters of credit as collateral, including the extent of exemptions granted. | *Fully addressed.*<br><br>CME's Collateral Policy sets a cap on the use of letters of credit as collateral. During the assessment period, CME granted no additional exemptions to these caps to clearing participants. As at end December 2016, three clearing participants held exemptions. |
| 7. 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 Liquidity Risk Management Framework (LRMF), and to engage with the Bank on the results. The Bank expects to continue to engage with CME regarding its management and governance of liquidity risk more broadly, including how the board oversees the management of liquidity risk. | *Mostly addressed. Expected to be fully addressed in 2017.*<br><br>CME has engaged with the Bank regarding its management and governance of liquidity risk. CME has made improvements to the governance arrangements for liquidity risk, including introducing a requirement for the LRMF to be reviewed and approved by the board-level Clearing House Oversight Committee at least annually before it is sent to the board.<br><br>CME is currently conducting an independent review of the LRMF. The Bank expects CME to share the report from this review once it is finalised and engage with the Bank on the results. |
| 15. Custody and investment risks | The Bank expects CME to continue to reduce the size and concentration of its unsecured investments of cash collateral with non-government obligors. The Bank expects to engage further with CME as it implements these changes and will continue to monitor CME's cash collateral investments. The Bank will also engage CME to understand the governance arrangements regarding its investment exposures in more detail, including what oversight the board has of these exposures. | *Mostly addressed. Ongoing monitoring in 2017.*<br><br>During the assessment period, CME has worked towards expanding its number of investment counterparties, including opening accounts at central banks.<br><br>CME's governance arrangements include consideration of unsecured exposures.<br><br>Going forward, the Bank will monitor the outcome of these developments on the size and concentration of its unsecured investments of cash collateral with non-government obligors. |
| 19. Financial Market Infrastructure (FMI) links | The Bank will continue to monitor CME's links, with a view to revisiting this issue if there is a material increase in exposures. The Bank expects to be notified by CME of any such increase in exposures. In such an event, the Bank will also seek to engage with other relevant regulators.<br><br>The Bank expects CME to provide accurate and timely data regarding its exposures across its links with other CCPs.<br><br>The Bank expects that CME will not permit letters of credit as acceptable collateral for any future links. | *Fully addressed.*<br><br>CME now provides the Bank with data on the exposures across its links with other CCPs on a regular basis. Exposures across these links remain relatively small compared with CME's overall exposure. CME continues to accept letters of credit to cover exposures across its link with Singapore Exchange Limited (SGX) but has not accepted letters of credit for any other of its links. CME has not entered into any further links with other CCPs during the period. |

## 1.2 2017 Supervisory Focus

The Bank is not setting regulatory priorities for CME for 2017. The Bank's supervisory focus for 2017 will be to assess the outcome of the work planned or recently completed by CME to fully address the 2016 priorities. Specifically, the Bank will:

- review CME's enhancements to its recovery and wind-down plans
- review the results of the planned independent review of CME's LRMF once it is completed

- monitor the size and concentration of CME's unsecured investments of cash collateral with non-government obligors.

Some of this work will also overlap with the follow-up targeted review currently being conducted by CPMI and IOSCO (see section 2.3.1 for further details).

During the assessment period, CPMI and IOSCO also finalised the Cyber Resilience Guidance and consulted on draft CCP Resilience and Recovery Guidance (for more information on the reports, see section 2.3.2). Over the coming year, the Bank expects CME to consider any implications these reports have for CME.

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, 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.

However, as the Bank does not currently anticipate this to occur in the near to medium term, these will not be a supervisory focus for 2017.

# 2. Material Developments Relating to the Bank's Assessment

This section provides more details about CME's progress towards addressing the regulatory priorities outlined in section 1.1 and highlights other relevant regulatory developments.

## 2.1 General Regulatory Priorities

### 2.1.1 Recovery and wind-down plans

The March 2016 Assessment set a priority that CME should complete its work to implement its recovery and wind-down plans. During the assessment period, CME developed revised recovery and wind-down plans for its three clearing services, i.e. Base, OTC IRS and CDS, each with its own pre-funded resources, which remain separated when managing a default.[6] CME implemented rule changes (required to give effect to these plans) for its Base clearing service at the end of the assessment period. In 2017, CME will, where applicable, make conforming changes to the end of waterfall rules for its OTC IRS and CDS services. During the process of developing its recovery and wind-down plans and associated rule changes, CME has engaged with the CFTC and taken into account the CPMI-IOSCO report on *Recovery of Financial Market Infrastructures*.[7] CME has also consulted with clearing participants and other relevant stakeholders.

The Bank will review CME's recovery and wind-down plans in the next assessment period.

### 2.1.2 Unsecured investments

One of the Bank's 2016 regulatory priorities was that CME continue to reduce the size and concentration of its unsecured investments of cash collateral with non-government obligors. CME's governance arrangements include consideration of unsecured exposures. CME's Investment Policy outlines its key investment principles, in order of priority: safety and preservation of principal; liquidity; and return. The Investment Policy also sets out portfolio concentration limits for each asset type. These principles and limits guide CME's allocation of cash to different investments. In addition to this, CME has informal guidelines for investment targets that are used by staff for the day-to-day management of investments. CME's Investment Policy must be approved by the Credit Committee and the board-level Clearing House Oversight Committee, with reviews conducted at least annually by these two committees. In order to oversee investments, the board-level Clearing House Oversight Committee receives reports on a quarterly basis. These reports include information on investment exposures and the degree of concentration of unsecured investments at commercial banks. The board receives information on CME's investments via the Clearing House Oversight Committee.

Furthermore, CME's Credit Policy establishes minimum credit standards and an approach to assessing and managing credit risk to CME's investment counterparties. CME's management of credit risk

6 As discussed in B.2.3, losses in one CME service cannot be applied to the mutualised resources of the default waterfall of another CME service, and in an extreme situation, a given CME service could also be closed, while the other services remained open.

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

involves conducting internal risk assessments and periodic reviews of counterparty risks, and states that single counterparty limits should be determined on a quarterly basis. The Credit Policy is reviewed and approved by the Clearing House Risk Committee at least once a year and is also subject to periodic internal audits.

During the assessment period, CME has worked towards expanding the number of investment counterparties it has, including opening accounts at central banks. In November, CME began depositing house funds in its account at the Federal Reserve Bank of Chicago. CME was also recently authorised to deposit client funds with the Federal Reserve. This was facilitated by the CFTC's announced exemptions that allow CME (and other systemically important CCPs) to place client funds in accounts with the Federal Reserve. CME also opened accounts at the Bank of Canada that became operational during the assessment period. CME deposits a small amount of Canadian dollars with the Bank of Canada. CME is also negotiating arrangements to invest on a secured basis, through reverse repos, with additional counterparties.

As a result, the proportion of cash collateral CME invests on an unsecured basis with non-government obligors has decreased modestly over the assessment period. This is despite an increase in the amount of cash collateral CME has received, which has meant that there has been little change in the size of CME's unsecured investments with commercial banks. At end December 2016, CME had US$15.2 billion invested on an unsecured basis with commercial banks.

The concentration of CME's unsecured investments fell during the assessment period, partly as a result of the addition of two counterparties that CME actively invests with on an unsecured basis. At end December 2016, 74 per cent of CME's unsecured investments were held with three counterparties, down from 79 per cent at end December 2015. CME is negotiating arrangements with several other commercial banks to invest on an unsecured basis.

The use of accounts at central banks and the expansion in the number of investment counterparties described above are expected to allow CME to reduce the size and further reduce the concentration of these investments. The Bank will monitor the outcome of these developments on a quarterly basis.

### 2.1.3 Model testing and validation

In the March 2016 Assessment, the Bank stated that it would monitor CME's application and the ongoing adequacy of the Model Validation Framework implemented during the previous assessment period, including the governance process. To support this, the Bank expected CME to share the reports from the validations that it finalised during the assessment period and engage with the Bank on the results. External validation reports for SPAN and the Collateral Haircut Model were completed in August 2016, and CME shared these reports with the Bank in early 2017.[8]

CME updated its Model Validation Framework during the assessment period. The changes made reflect updated governance arrangements, which now require the board-level Clearing House Oversight Committee to approve the framework on an annual basis and all substantive changes. The revised framework also provided additional detail on the scope of model validations and the selection criteria for model validators.

The Model Validation Framework specifies that CME's Global Assurance team (i.e. internal audit) will periodically assess the model validation process to ensure that it is robust, complies with regulatory and CME requirements, and has appropriate management and controls. The most recent internal audit of the model validation process, which was completed in November 2015, concluded that the overall governance of the process was adequate, the highest possible rating.

8 CME's model validation schedule for 2016 was revised during the assessment period, reflecting a number of factors including business priorities, regulatory requests and other operational factors. All revisions are reviewed and approved by the Model Risk Committee.

CME's Model Validation Framework envisages that validations may be conducted either by external independent consultants or an independent internal model validation function. In either case, validators must be independent from both the developers and the users of the model. During the assessment period, CME utilised both external consultants and its internal audit team to conduct model validations.

### 2.1.4 Liquidity risk

In line with the Bank's 2016 priority on liquidity risk, CME has continued to engage with the Bank on its management and governance of liquidity risk, including how the board oversees the management of liquidity risk.

Over the assessment period, CME made improvements to the governance arrangements for liquidity risk. In addition to being approved by the Credit Committee and the Clearing House Risk Committee, the LRMF must now be reviewed by the board-level Clearing House Oversight Committee before a recommendation for approval is made to the board. This review and approval process is run at least annually. The LRMF is also subject to internal audits at the discretion of CME's Global Assurance team.

In addition to the internal audits, the Global Assurance team recently commenced an independent review of the LMRF.[9] This review will meet the requirements of a validation under CME's Model Validation Framework. The review will include an assessment of the adequacy of the management reports on liquidity risk (its 'liquidity dashboard'), to which CME recently implemented enhancements. The Bank expects CME to share the report from this review once it is finalised and engage with the Bank on the results.

CME also recently introduced liquidity-specific stress testing scenarios, consistent with the recommendation made in the recent review by CPMI-IOSCO (see section 2.3.2 for details).

### 2.1.5 Letters of credit

CME accepts letters of credit (LOC) as collateral to cover initial margin requirements related to Base products only. Clearing participants that are affiliated with a financial entity are not permitted to meet house initial margin requirements using LOC, except to meet intraday margin calls as a 'buffer', although they may provide LOC to meet non-financial clients' margin obligations.[10] The value of LOC that CME will accept from any clearing participant, aggregated across house and client accounts, is capped at the lesser of 25 per cent of that participant's initial margin requirements or US$500 million. Limited exemptions to this cap, up to US$1 billion, may be granted to clearing participants that wish to post additional LOC on behalf of particular non-financial clients.

In the March 2016 Assessment, the Bank stated that it would monitor CME's acceptance of LOC as collateral, including the extent of exemptions granted. At end December 2016, CME's clearing participants had applied US$1.8 billion of LOC as collateral to meet margin requirements for Base products, equivalent to 1.7 per cent of total initial margin requirements for those products. Three clearing participants have been granted exemptions to date, allowing each to post additional LOC on behalf of a non-financial client. No additional clearing participants were granted exemptions during the assessment period.

As the use of LOC is limited and exemptions are expected to be granted on an exceptions basis, the Bank has concluded that CME has fully addressed this regulatory priority. However, going forward the

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9 During the assessment period CME determined that it was more appropriate for its Global Assurance team to conduct an independent 'review' of the LMRF, rather than have the model externally validated.

10 The use of the buffer allows a clearing participant to temporarily use LOC to cover intraday liabilities arising from new trade registrations and intraday margin liabilities on existing positions. If this facility is used, the LOC must be replaced with another form of collateral by the next settlement cycle. CME has informed the Bank that no clearing participants have posted LOC as a buffer over the past few years.

Bank will continue to collect data on the acceptance of LOC as collateral on a quarterly basis, with a view to revisiting this issue if there is a material increase.

### 2.1.6 FMI links

CCP Standard 19 requires that a CCP that establishes a link with one or more FMIs should identify, monitor and manage link-related risks. The standard also sets specific requirements regarding links that CCPs maintain with other CCPs. CME maintains three links with other CCPs: a Mutual Offset System (MOS) arrangement with SGX and cross-margining agreements with the Fixed Income Clearing Corporation and Options Clearing Corporation.[11]

During the assessment period, CME started regularly providing the Bank with data on the exposures across its links with other CCPs. The data indicate that CME's exposures to other CCPs in absolute terms remain relatively small compared to CME's overall exposure. CME continues to accept LOC to cover exposures across its link with SGX but has not accepted LOC for any other of its links. CME has not entered into any further links with other CCPs during the period.

The Bank has concluded that CME has fully addressed this regulatory priority. However, the Bank expects to be notified by CME if there is a material increase in exposures to linked FMIs. In such an event, the Bank will revisit this issue and seek to engage with other relevant regulators.

## 2.2 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 that CME should make substantial progress against regulatory priorities specifically related to the provision of services to the Australian market until such time that CME has material direct Australian participation or there is a significant increase in CME's provision of services of Australian-related products.

## 2.3 Other Regulatory Developments

### 2.3.1 CPMI-IOSCO implementation monitoring

In August, CPMI and IOSCO published a report on the results of a peer review examining consistency in the outcomes of CCPs' implementation of the *Principles for Financial Market Infrastructures* (PFMI) with respect to their financial risk management and recovery practices.[12] This review covered 10 CCPs internationally that provide clearing services for derivatives, including CME.

CPMI and IOSCO recently launched a follow-up targeted review of CCPs' progress in addressing the most serious issues of concern identified in the August report. The Bank will be participating in this review, and through this will monitor how CME has responded, where relevant, to the issues identified.

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11 The MOS is a peer to peer CCP link that permits clearing participants to execute on a trading venue cleared by one CCP, and have the position transferred to the other CCP to carry. Cross margining arrangements allow clearing participants, or their customers, to reduce their total initial margin requirements where they hold related, offsetting positions at the two CCPs that participate in the arrangement. Due to the product scope of CME's Australian CS facility licence, the SGX link is the only link that is potentially of direct relevance to Australian clearing participants.

12 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>.

### 2.3.2 Additional guidance

***Cyber resilience guidance***

In recent years, the growing threat of cyber attacks has posed an increasing risk to FMIs' operational resilience. Recognising this, CPMI and IOSCO have made the resilience of FMIs to cyber threats a strategic priority. As part of its work in this area, in June 2016, CPMI and IOSCO released guidance in the area of cyber resilience to support relevant requirements in the PFMI.[13] The guidance is intended to help FMIs enhance their cyber resilience and provide a framework for supervisory dialogue.

The Bank has formally adopted the Cyber Resilience Guidance to support its assessments against relevant requirements in the CCP Standards. It therefore expects CME to consider any implications of this guidance for its operations.

***CCP resilience and recovery guidance***

In light of the increasing systemic importance of CCPs, a number of international standard-setting bodies have developed a joint workplan to further enhance the effectiveness of CCP resilience, recovery and resolution. As part of this work plan, CPMI and IOSCO are developing additional guidance that provides further clarity and granularity on several key aspects of the PFMI to further improve CCP resilience. In August, CPMI and IOSCO published for comment additional guidance on certain principles and key considerations in the PFMI.[14] The proposed guidance provides more detailed descriptions of how CCPs are expected to implement the PFMI in order to improve their resilience and recovery planning. The guidance focuses on governance, credit and liquidity stress testing (including coverage of the resulting credit and liquidity resource requirements), margin and a CCP's contribution to its pre-funded resources. The report also proposes guidance that is intended to facilitate a CCP's development of its recovery plan by building on and reiterating certain aspects of the recovery report.

The Bank expects to adopt the CCP Resilience and Recovery Guidance after it is finalised, at which point it will expect CME to consider the implications of this guidance for its financial risk management.

13 See CPMI-IOSCO (2016), 'Guidance on cyber resilience for financial market infrastructures', June. Available at <http://www.bis.org/cpmi/publ/d146.pdf>.

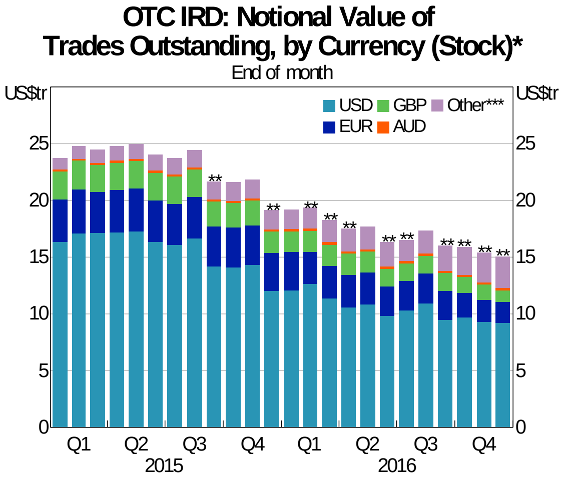
14 See CPMI-IOSCO (2016), 'Resilience and recovery of central counterparties (CCPs): Further guidance on the PFMI', August. Available at <http://www.bis.org/cpmi/publ/d149.pdf>.

# Appendix A: Activity in CME

## A.1 OTC IRD

CME clears OTC IRD denominated in 19 different currencies, including Australian dollars. The notional value of cleared OTC IRD transactions outstanding with CME decreased over the assessment period, from US$19.1 trillion at end December 2015 to US$15.0 trillion at end December 2016 (Graph 1). USD-denominated OTC IRD accounted for around 73 per cent of OTC IRD transactions cleared by CME in 2016. On average over the assessment period, 1.2 per cent of the total notional value of OTC IRD outstanding with CME was denominated in Australian dollars. The reductions in notional value outstanding over the assessment period were largely driven by trade compression cycles for US dollar, euro, UK pound and Mexican peso-denominated OTC IRD contracts.

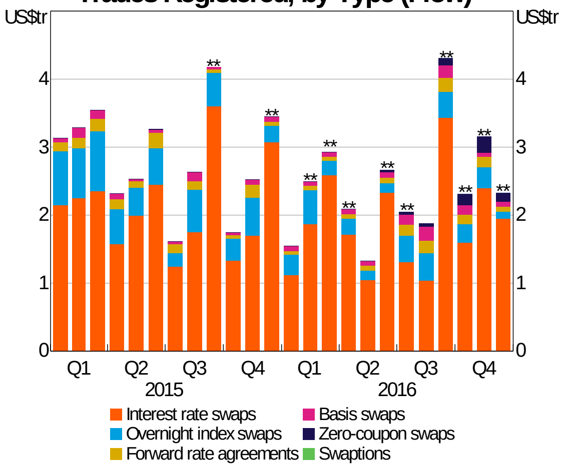
**Graph 1**




* Data counts one side of each trade
** CME conducted a TriOptima compression run in this month
*** Includes BRL, CAD, CHF, CZK, DKK, HKD, HUF, JPY, MXN, NOK, NZD, PLN, SEK, SGD, ZAR
Source: CME Inc.

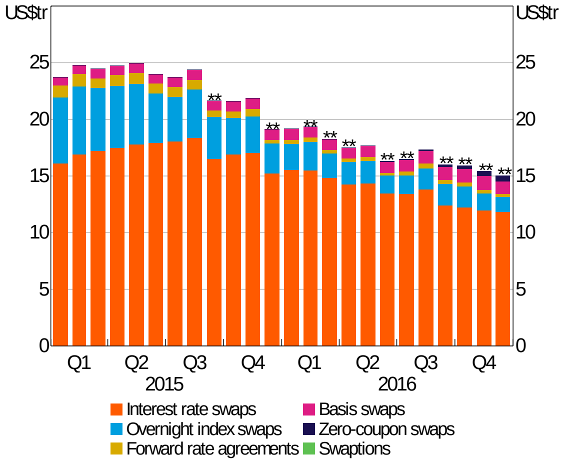
CME clears six types of OTC IRD: IRS, zero-coupon swaps, basis swaps, forward rate agreements, overnight index swaps (OIS) and swaptions. The swaptions service was launched by CME in April 2016. CME also launched Australian dollar-denominated OIS during the assessment period. Graph 2 and Graph 3 depict notional value registered and notional value outstanding in CME's OTC IRS service, respectively, 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
Source: CME Inc.

**Graph 3**
**OTC IRD: Notional Value of Trades Outstanding, by Type (Stock)***
End of month



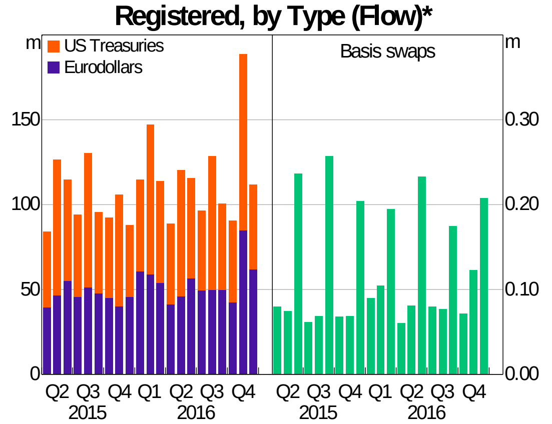

* Data counts one side of each trade
** CME conducted a TriOptima compression run in this month
Source: CME Inc.

## 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 clear 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, US Treasury futures and US deliverable swap futures traded on the CBOT exchange, and Eurodollar futures traded on the CME exchange.[15]

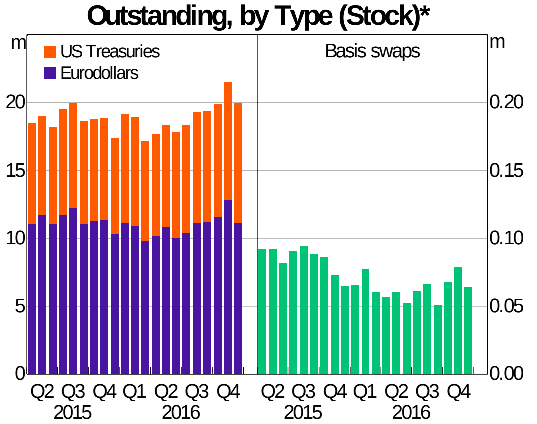
The number of trades registered and outstanding in these products, by product type, is depicted in Graph 4 and Graph 5, respectively.

**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 Inc.

**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 Inc.

15 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.

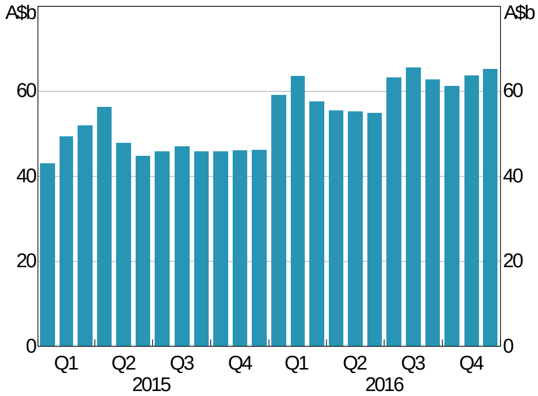
## A.3 Australian Activity

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 with CME, as clients of direct clearing participants. At end December 2016, the notional value outstanding of indirect Australian participants' OTC IRD trades in all currencies was around A$65 billion (Graph 6).

**Graph 6**

**OTC IRD: Notional Value Outstanding of Australian Indirect Participants (Stock)***

End of month




* Data counts one side of each trade

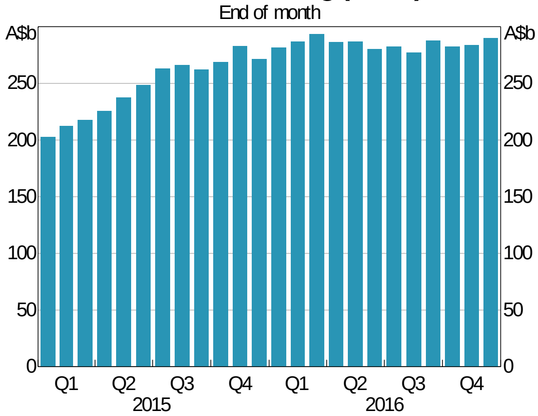
Source: CME Inc

Graph 7 and Graph 8 depict the notional value of Australian dollar-denominated OTC IRD trades outstanding and registered with CME. At end December 2016, CME had around A$290 billion notional value of Australian dollar-denominated OTC IRD trades outstanding.[16] This represents around 3 per cent of the notional value outstanding of all centrally cleared Australian dollar-denominated OTC IRD trades (around A$20 trillion at end December 2016).[17]

**Graph 7**

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

End of month



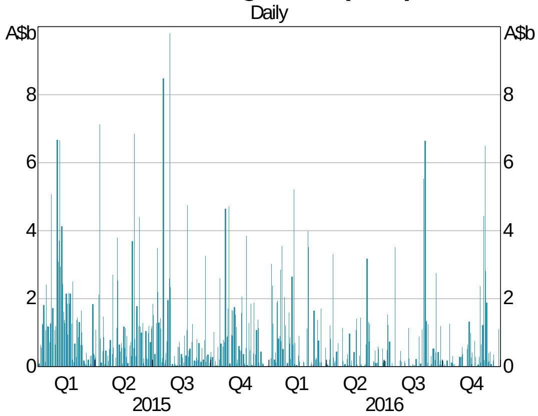

* Data counts one side of each trade

Source: CME Inc.

**Graph 8**

**OTC IRD: Notional Value of AUD-denominated Trades Registered (Flow)***

Daily




* Data counts one side of each trade

Source: CME Inc.

16 This figure counts one side of each trade.

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

# Appendix B: CME Regulatory Environment and Risk Management

## B.1 Regulatory Framework

CME is incorporated in the US 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.

In Australia, CME is licensed under section 824B(2) of the *Corporations Act 2001*, 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. The regulatory regime in the US, as administered by the CFTC, is considered to be sufficiently equivalent to that in Australia.[18] 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.[19] The MoU provides a framework for cooperation among the authorities, including information sharing and investigative assistance.

During the assessment period, CME was granted recognition as a third-country CCP by 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)).[20] CME was also authorised in Japan, Singapore, Hong Kong and Mexico during the assessment period.

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

## 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 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.

18 More detail on the supervisory approach of the CFTC is available in the Bank's March 2016 Assessment. Available at <http://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>.

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

20 CME Clearing Europe (CME Group's European clearing house) is separately authorised under EMIR and regulated by the Bank of England as a Recognised Central Counterparty.

### 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.[21] Prospective participants must also satisfy a number of other requirements, including regarding their operational and technological capabilities, and disaster recovery and business continuity arrangements. Once accepted, clearing participants must meet minimum guaranty fund contributions, set at a minimum of 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 and once a day for OTC IRD.
- *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 and once a day for OTC IRD.[22] 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.
- *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 one ad hoc intraday margin call for OTC IRD over the assessment period in response to market movements on the day after the UK referendum on EU membership on 24 June.

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21 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. Banks that clear OTC-traded Base products as well as exchange-traded derivatives must meet the higher capital requirement of US$5 billion.

22 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 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.

- *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 both a participant's variation margin pays threshold and capital threshold (or a pre-defined absolute threshold).[23] For OTC IRD, CME may apply a concentration margin in the form of a liquidity charge multiplier. CME routinely calls concentration margin from clearing participants.

CME calculates initial margin requirements for OTC IRD using a Historical Value at Risk (HVaR) methodology, with historical returns scaled using exponentially weighted moving average volatility. CME targets an *ex post* coverage of 99 per cent assuming a close-out period of five days. In addition to stressed periods, such as the global financial crisis period of 2008–09, a rolling look-back period of five years is used to provide a set of historical scenarios. 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 IRD positions are HVaR margined and so are subject to a five-day close-out period.

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 (as well as for its CDS clearing service), which determine the order in which financial resources would be used to cover default losses within each of the services.[24] Each waterfall is segregated from the others, 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 remaining losses arising from the default with a pool of pre-funded mutualised resources, which are comprised of 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 2016), 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.

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23 The variation margin pays threshold is an average of the three highest variation margin pays over the past twelve months. For non-bank clearing participants, capital is defined as net adjusted 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.

24 As noted above, this Assessment does not cover CDS products, as CME is not licensed to clear CDS in Australia.

The Base and OTC IRS 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 31 December 2016, the size of the Base and OTC IRS guaranty funds were US$3.33 billion and US$1.97 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 for the Base guaranty fund was changed to one month (from three months) during the 2016 assessment period, to be in line with the OTC IRS guaranty fund. 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 on a daily basis through stress testing. 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.[25] In the event that CME is concerned 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 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 performed off-cycle resizings of the OTC IRS guaranty fund on 21 April and 8 September. CME also twice performed off-cycle resizings of its Base guaranty fund, on 21 January and 1 February.

***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.[26] 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 payment.

These payments are subject to participants' maximum obligations during the relevant 'cooling off period'.[27] For the Base guaranty fund, the maximum amount CME can call varies 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

25 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 is in the process of removing excess collateral from stress testing. This process will be completed in the next assessment period.

26 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.

27 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 days and for the OTC IRS guaranty fund is 25 business days. It is due to the longer cooling off period for OTC IRS, during which multiple stress scenarios may be experienced, that CME uses a more conservative approach when sizing the OTC IRS guaranty fund.

participants default within a five-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.

Should uncovered losses remain, CME would implement its recovery and wind-down plan, which has 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. For its Base service, CME would follow the close-out netting procedures described in its rulebook and institute a full tear-up of contracts. During the assessment period, CME implemented rule changes to add voluntary contributions, voluntary tear-ups, and mandatory portfolio gains haircuts and partial 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 the Base service. For its OTC IRS service, CME would implement variation margin gains haircutting in conjunction with a full tear-up of contracts.[28]

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

# Abbreviations

| | | | |
|---|---|---|---|
| ASIC | Australian Securities and Investments Commission | HVaR | Historical Value at Risk |
| CBOT | Chicago Board of Trade | IOSCO | International Organization of Securities Commissions |
| CCP | Central counterparty | IRD | Interest rate derivatives |
| CCP Standards | Financial Stability Standards for Central Counterparties | IRS | Interest rate swap |
| CDS | Credit default swap | LOC | Letters of credit |
| CFR | Council of Financial Regulators | LRMF | Liquidity Risk Management Framework |
| CFTC | Commodity Futures Trading Commission | MOS | Mutual Offset System |
| CME | Chicago Mercantile Exchange Inc. | MoU | Memorandum of Understanding |
| CPMI | Committee on Payments and Market Infrastructures | OIS | Overnight index swaps |
| CS | Clearing and settlement | OTC | Over-the-counter |
| EMIR | European Regulation on OTC derivatives, central counterparties and trade repositories | PFMI | Principles for Financial Market Infrastructures |
| ESMA | European Securities and Markets Authority | SGX | Singapore Exchange Limited |
| FMI | Financial market infrastructure | SIDCO | Systemically Important Derivatives Clearing Organization |
| FSS | Financial Stability Standards | SPAN | Standard Portfolio Analysis of Risk |
| FX | Foreign exchange | US | United States |